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VOL. 5 NO. 3
MARCH 1985

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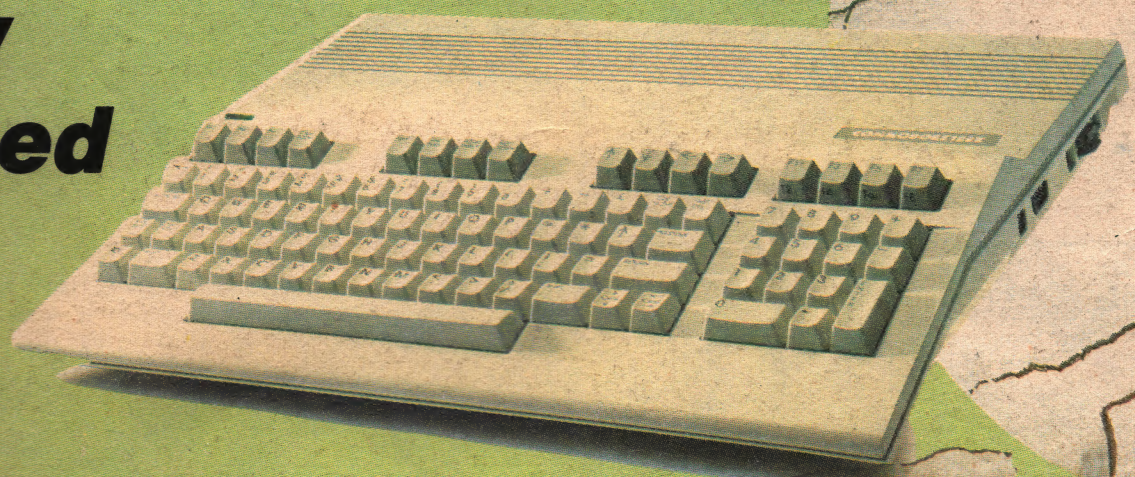

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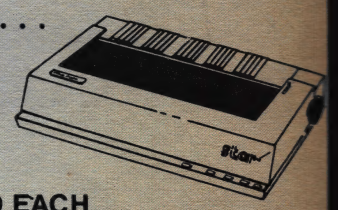

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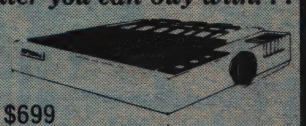

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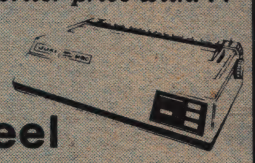

With the advanced features of a high priced daisywheel combined with convenience and dependability, the Juki 6100 is the printer for you. With this industry leader you do not have to give up quality for savings. You can trust your business image to Juki. And you need not worry about hardware or software compatibility problems. The Juki 6100 is plug compatible with all popular microcomputers as well as with such software packages as Wordstar and SUPERscripsit. You can even print charts and graphs. You will save time and effort with the standard 2K print buffer. So order your Juki 6100 today at this special sale price of only $429.

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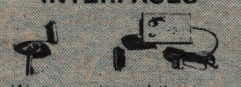

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Publisher ..... Glenn E. Patch
Assistant Publisher ..... Linda Rew
Editor-In-Chief ..... Stan Veit
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Compositors (Display) ..... Mary Faenza, Lori Conway
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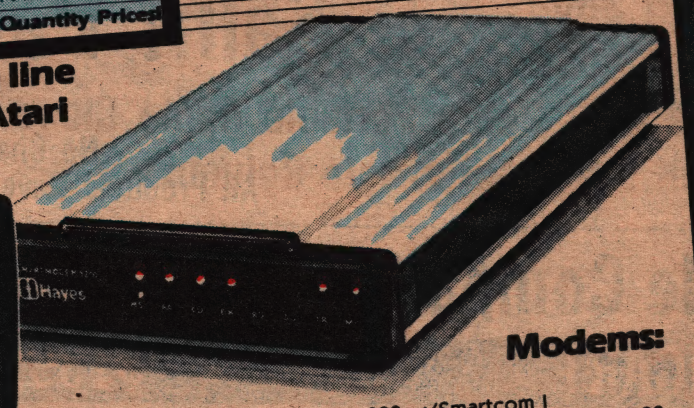

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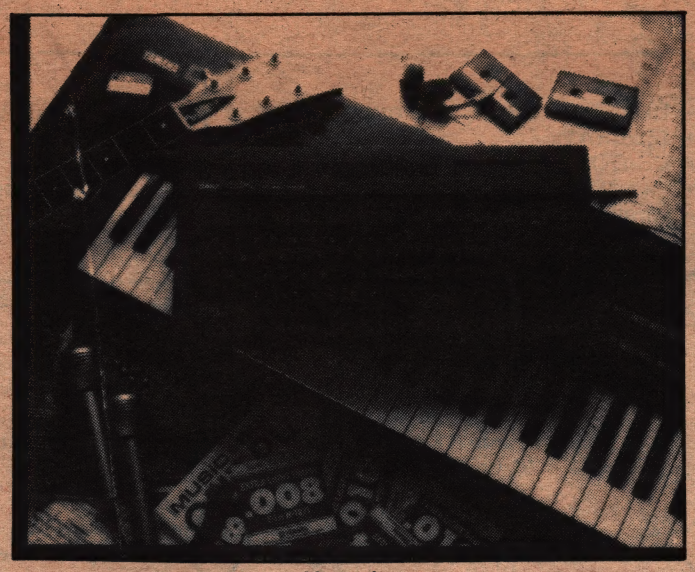
MSX Computers Introduced at Winter CES

Ever since June of 1983 when Microsoft announced that they had sold the rights to MSX (Microsoft Extended Basic) to a group of 14 Japanese electronics manufacturers and Spectravideo of New York, Americans have been waiting for the introduction of these new computers. What has interested people is not the use of MSX BASIC but the fact that the members of this group are the most respected names in the Japanese electronics industry and that MSX promised the one thing that has been lacking in the personal computer world—standardization and interchangeability. To people with closets full of old TI-99/4A and Timex computers for which they can not readily find software, the idea of a standard cartridge that fits many computers or a standard diskette that can be used by many similar computers has great appeal. Retailers who must stock an Apple, a Commodore, an Atari and a PC version of popular software also yearn for a standard—any standard.

The Japanese manufacturers who are in the MSX group are all respected names in the world of consumer electronics— Sony, Hitachi, Mitsubishi Electric, Toshiba, Pioneer, Yamaha, Casio, Canon, Sanyo, Victor of Japan, Fujitsu and one Korean company Daewoo.

Each has built its own version of MSX because the specification imposes no rigid design, merely calling for use of the same chips, operating system and interchangeable cartridge socket.

The basic MSX computer consists of a Z-80 CPU, 32K ROM with MSX BASIC, a T.I. TMS9929A Graphics Chip, an AY3-8910A or equal sound chip, 16/32K RAM, 32K ROM, and an MSX cartridge slot. This is the minimum. Many of the versions also add additional video RAM and a DOS for floppy disks. The interesting thing is that each member of the group has interpreted the computer according to its general line of electronics. For example, Yamaha uses the MSX computer in conjunction with its line of musical keyboards and instruments. Panasonic mates the MSX with its video cassette recorders. Pioneer controls audio systems with MSX computers.



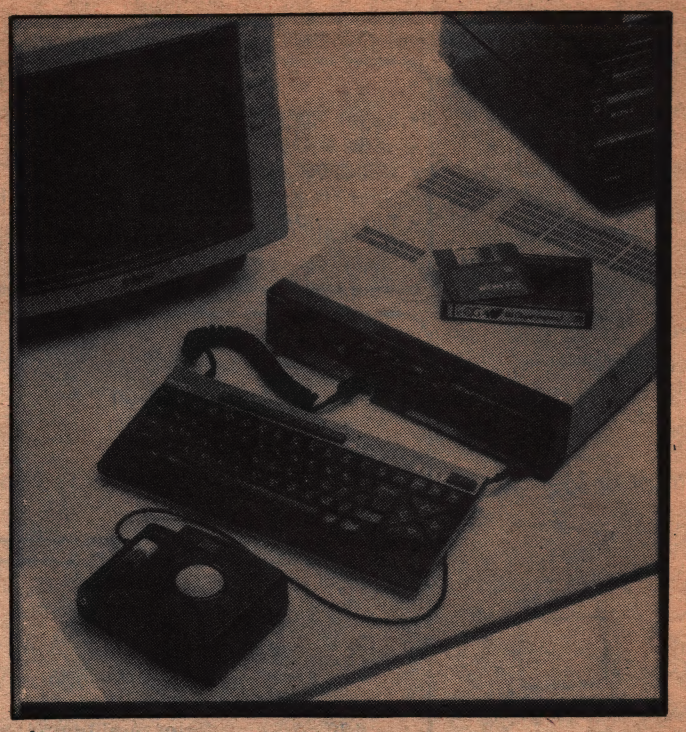
Yamaha

In 1983, MSX computers were introduced in Japan. During the Christmas rush, they sold more than 50,000 units within a few days of their appearance. Then they were introduced in Europe and while they have been well received, they broke no sales records. The manufacturers have been hesitant about introducing the MSX machines into the United States because of the debacle in the home computer market. Seeing firms like Texas Instruments, Timex, Atari and Mattel failing in the market made them very cautious. In addition, since the MSX machines were 8-bit, Z80-based machines and the market trend in the US is toward 16-bit computers, this natural caution was enhanced. Now the picture has changed. Commodore, who really frightened the Japanese, is upgrading from the home computer market to the personal computer market. Atari, under Jack Tremiel, is not yet established in the market, and Apple has not moved to low-priced computers. The field is completely open to them. So, they arrived at the Winter Consumer Electronics Show for a group show under the leadership of Kay Nishi, Executive Vice-President of Microsoft, "father" of MSX and a greatly respected figure in the industry on both sides of the Pacific.

At the CES Show, the MSX booth was a center of activity, showing MSX with video from Panasonic and Sony, MSX with music from Yamaha, MSX running Logo Lisp Software and MSX running a wide range of games. Nearby in the Kjonami Software, MSX computers were displayed running all kinds of games including Track & Field, Yie Ar Kung-Fu, Hyper Sports, Time Pilot, Super Cobra, Golf, Baseball Billiards, and Pin Ball. This software runs on all of the 26 models of MSX computers made by 12 firms and is priced at $19.95 for each title. AACKSOFT International of Holland, specializing in MSX software, exhibited their programs which included games, educational software and business programs. Their business programs include word processing, spreadsheet, bookkeeping, file system and a sort program. These titles are available in English, French, German, Spanish and Dutch.

What Will They Cost?

No prices have been set for the sale of MSX computers in the U.S. Retail prices in Japan (in U.S. dollars) range from $212 for the Yamaha YIS-303 to $313 for the Sanyo MPC-10. Obviously, these prices will have to be adjusted to compete with Atari and Commodore. It is said that the Japanese will sell as low as $100 to get a toehold in the market. This could be an expensive toe with Atari selling 800XL computers for $119 but time will tell.



Sony

When Will They Be Here?

They would not say when they would get here only that it would be "soon." Again, a lot depends on the other two unpriced models at the show. If Jack Tremiel prices the Atari 65XE low enough, he may scare them away. The same with the Commodore 128. If the Japanese do not come by this summer, they had just as well forget it. The 8-bit window will close as far as any new computer is concerned.

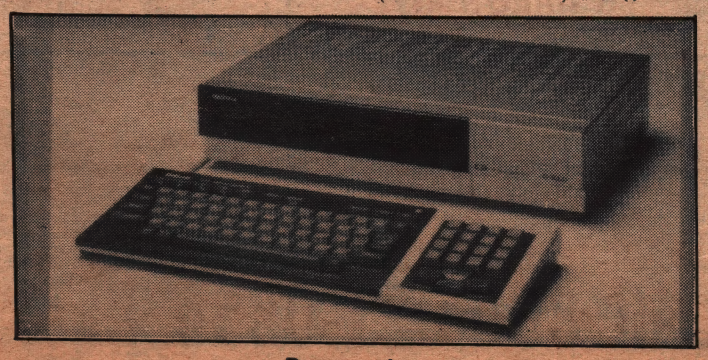
Toshiba HX-22 Home Computer

Typical of the MSX computers, the Toshiba HX-22 uses the Z-80 operating at 3.58MHz. The system ROM is 32K and contains MSX BASIC and a word processor. The main RAM is 64K and there is also 16KBytes of video RAM.

The display is either 32 columns or 40 columns by 24 rows. Graphics resolution is 256 by 192 pixels and 32 possible sprites. Sixteen colors are possible. For sound there are 8 octaves, triple chord plus one sound effect. The keyboard has 73 numeric and graphic keys. There is a cassette interface operating at 1200 baud and 2 cartridge slots. External connectors include a Centronics parallel port, an RS-232C serial port, RF Modulator, Composite Video, RGB Video, and 2 Stereo Sound ports.

This is a lot of computer especially when expanded to include a disk drive. In any event, a well known name like Toshiba will have no trouble selling this machine if it comes in near the $300 mark. ●

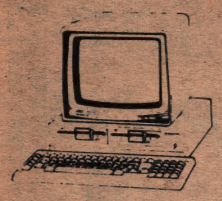
Toshiba



Panasonic

Mitsubishi Electric

SUPER SANYO SYSTEMS



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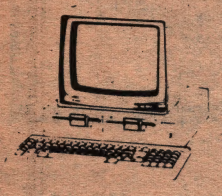

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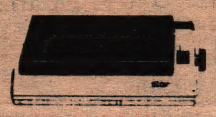

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- Parallel Interface

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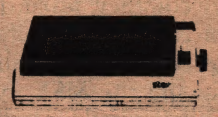

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- Parallel Interface

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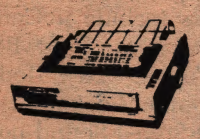

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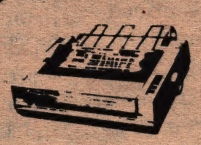

Panasonic KXP-1091
- 120 cps draft
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- Bidirectional, Logic Seeking
- High Resolution Graphics
- Tractor and Friction Feed
- Parallel Interface
- 1K Text Buffer

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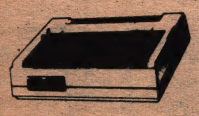

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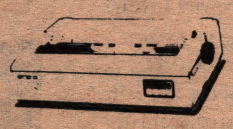

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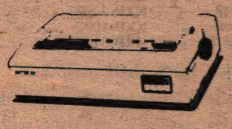

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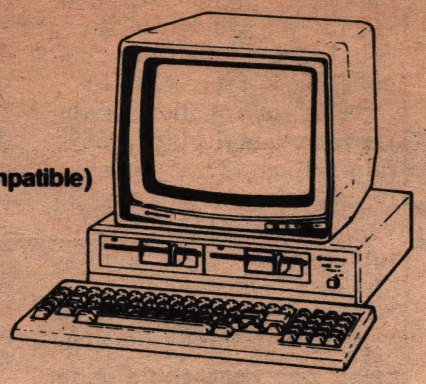

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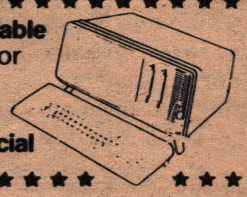

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star

SG-10	120 cps, near letter quality	$249
SG-15	120 cps, near letter quality	$389
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Database Systems Today

by Stan Veit

The major work of computers is accomplished by a triad of computer software systems: Accounting Systems, Word Processing Systems or Database Management Systems. In the world of personal computers, database management has been the weak leg of the triad due to the small internal and external memory capacities of 8-bit personal computers.

Most of the DBMS software for personal computers were file management systems allowing for creation, retrieval, sorting and printing of simple data files. Programs for popular PCs like Apple, TRS-80, or Commodore were limited by the small amount of data storage per diskette and the limited RAM available to the user. I used DB Master for the Apple II and the disk shuffling was beyond belief when I think about it now. The major problem was that my data files were contained on many data disks making selection and sorting a nightmare. I say all this from my smug ownership of a 520K RAM, 11 Mbyte Disk PC, but for its time, the DB Master for my Apple II was a great program.

What could these DBMS programs do? They allowed you to set up your own databases, specifying the data records you wanted to store. (All the information about one employee was a record.) Each piece of information in the field is a data field (or type of information). For example, NAME is a field in an employee record. After setting up the records for a database, you could enter the information one record at a time. As you filled up one diskette, some programs allowed you to use another. More simple programs restricted you to the amount of data you could store for each database. Once you had the data entered you could select records by means of one or more "key" fields. For example, you could select all the records for people in one ZIP code area. Once selected, these names could be sorted and printed in Report Format or on a label format. You could select using some DBMS systems on the basis of logic. To "find the names of all customers who spent more than $1,000 in 1983" you could ask the system. DBMS would then select records using the "Sales" field as a key and applying the logic operation greater than 1000 as criteria.

Database Systems on personal computers have grown from small memory-bound file managers to large relational data management integrated systems. This is the introduction to an ongoing series examining this powerful software in depth.

The personal computers did not need a lot of internal memory to use this type of system because it would write data out to disk upon entry and read each record from the disk sequentially when selecting. It did need to hold the data in memory when sorting and formatting reports and this, of course, was a limitation of the system.

In the world of big computers, database management systems were advancing mainly because of the power of the machines used. Sequential files and indexed random file searches used for retrieving information in personal computers simply were not good enough for larger machines. Their methods of data search involving tree structures were developed to speed data selection and data flow (Figure 1). As memory capacity for PCs grew, these same methods were applied to the smaller computers.

The invention of VisiCalc and other spreadsheets was a milestone in the data management field. Accounts had always used big spreadsheets to view and analyze the complete financial picture on one piece of paper. The application of this principle to the personal computer resulted in VisiCalc with its ability to enter data based upon a stated formula, to recalculate the totals upon changes in data and to sum and average columns of data.

Then it was realized that the spreadsheet was really a data record which not only stored the information, but showed the relationship between the fields comprising the record. For example, it was a record of financial conditions for a business during one period. If you stacked a group of spreadsheets according to time periods, you had all the records of the companies finances over time. It was a database of a particular type now called a Relational Database.

In a relational database, the basic form is a table or matrix (spreadsheet). (Fig 2) The data records are organized as the Rows (sometimes called tuples) and the data fields are the columns (sometimes called (attributes). The search programs can select data, and by finding its location within the matrix, it can find all related data. Each sheet is called a Relationship and complex reports can be extracted from many relationships. This is one great power of a relationship, the other is its ability to be converted into other forms.

Once the wonder of PC spreadsheets became common, people began to ask for more! Wouldn't it be great if you could use the information in a spreadsheet or relational database within a letter, manual or report? How much more useful the relation (spreadsheet) would be if you could include comments in text within the matrix? How about being able to plot the relationships as a graph or histogram? The answer to these questions lead to the development of DIF (Data Interchange Format) which allowed the user to format data so it could be used in various programs.

The use of DIF was restricted to those who could learn to operate it. The vast majority of users simply were not technically able to operate at this level. This lead to the development of integrated software sytems such as Lotus 1-2-3, SuperCalc3 and others.

Today, the database capabilities of the integrated system has been vastly enlarged due to the huge memory capacity of PCs and the use of hard disks. The increased speed of the new CPUs and the graphic abilities has also been a factor.

This month Computer Shopper presents an in-depth review of KnowledgeMan by Wes Lewis, an expert in the field. During the next few months, we will examine other integrated systems for database capabilities. Don't miss one part of this exciting series.

Illustrations from *Using Microcomputers In Business*, Second Edition by Stanley Veit, Hayden Publishing Co. #6257-8. $12.95. ●

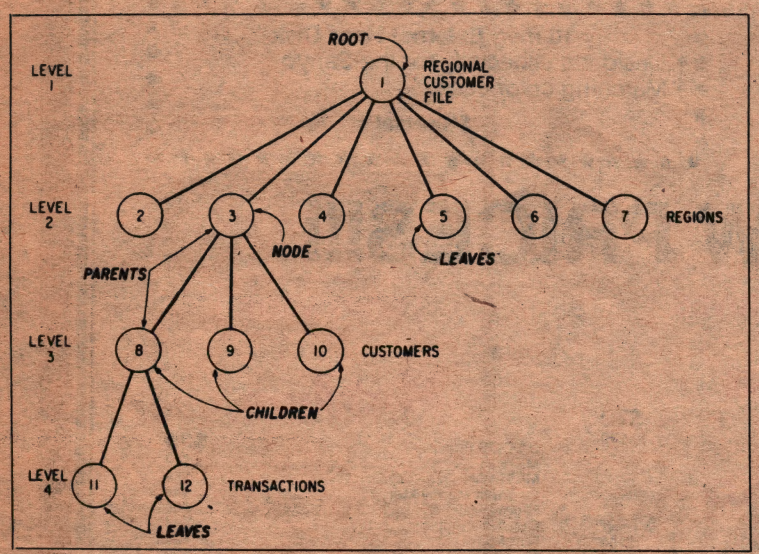

Figure 1—Tree Data Structure

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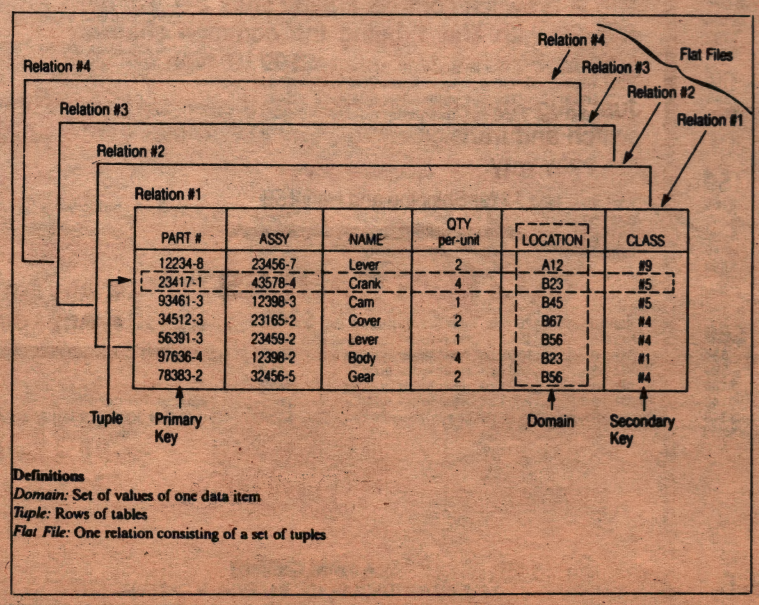
Relation #4
Relation #3
Relation #2
Relation #1
Flat Files
PART # | ASSY | NAME | QTY per-unit | LOCATION | CLASS
12234-8 | 23456-7 | Lever | 2 | A12 | #9
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93461-3 | 12398-3 | Cam | 1 | B45 | #5
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56391-3 | 23459-2 | Lever | 1 | B56 | #4
97636-4 | 12398-2 | Body | 4 | B23 | #1
78383-2 | 32456-5 | Gear | 2 | B56 | #4
Tuple
Primary Key
Domain
Secondary Key
Definitions
Domain: Set of values of one data item
Tuple: Rows of tables
Flat File: One relation consisting of a set of tuples

Figure 2—Relations in Relational Databases

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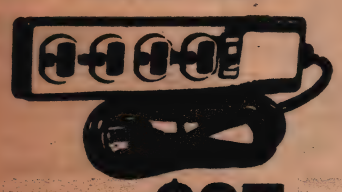

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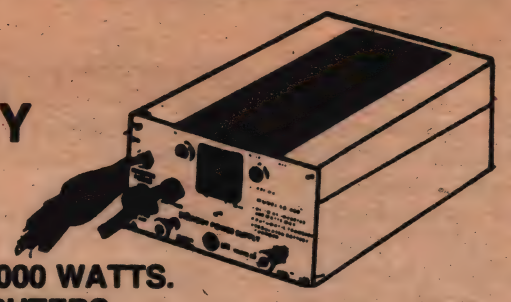

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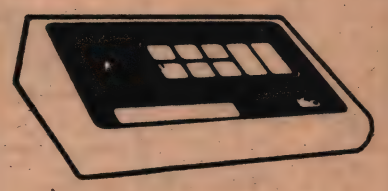

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How To Buy And Sell Used Computers — Part II

by Stan Veit

Where To Advertise Your Computer For Sale

Of course the answer is advertise it in the Computer Shopper classified ads. That way you have national coverage for your ad. This is important because even if you live in a large city, there may be only a small group of people interested in what you are offering to sell, and they might not read the local classified ads during the run of your ad. There is nothing as dead as yesterday's newspaper. On the other hand, our surveys show that people keep their Computer Shopper around for months and read and re-read it. Sooner or later, someone who wants your equipment is going to read your ad and act on it. If you can afford it and wish to cover all bases, you can also advertise in your local newspaper. Your club newsletter is another good place to advertise. It does not have to be a computer club; in fact, computer clubs are usually the worst place to sell. Everyone has a computer. Ads by members are usually free and the charge for non-members is small. I would also suggest an ad in your company newsletter if you have one, or tack up a notice on the company bulletin board. I sold a computer that way in two hours. People feel much more comfortable buying from someone within the same company.

Don't Sell To Friends — If Possible

It is much better to sell your computer to a stranger than to a friend - not that you are going to stick somebody and you would rather it be a stranger. The problem with selling to friends is that you are likely to sell your time along with the computer. Your friend will call you every time his computer program crashes, and you will spend your time giving a free course in computer science. If you don't want to be called on the phone at midnight with "I just got BDOS ERROR ON B:. What do I do now?" I repeat, sell to a stranger. One more thing, if you sell to a friend you will NEVER get rid of the computer! I once sold a computer to a friend and after a year the CRT died. He told all my other friends that I had stuck him with a bum computer.

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The most important thing in writing your classified ad is to clearly specify everything you are offering. This is no place to save money. If you use abbreviations, the reader may have no idea what you are saying and may skip your ad completely. If you only want to sell your items as a system, you must clearly state that fact. If you are willing to break up the system and sell the pieces, state a price for each item. If something is not working, say so and price accordingly. Computer hackers will buy it anyway if the price is right. Even if you are willing to haggle about price, don't say so in your ads. People will offer you less than your advertised price anyway. I don't like "best offer" ads. People feel they are in an auction where they only have one chance to bid. If you advertise and do not want to bargain, be sure to put the words "FIRM" after your price. However, you should be willing to discuss the price with the potential buyer if you really are intent on selling.

Continued on page 14

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Buy And Sell Used Computers
Continued from page 12

Exchanging The Computer And The Money

If you advertise in Computer Shopper or any other national paper, you and the potential buyer are faced with the problem of how to exchange the merchandise for the money. This is a problem because you are both dealing with strangers. You can send the merchandise COD but even then the buyer has no way of knowing if what they have received is as advertised until they open it and try the system.

Once you make contact with buyer or seller, you can exchange references until you are both satisfied that the person you are dealing with is reliable. I find that most people are honest, but I know that sooner or later I will get stuck. If you can't face that prospect, then only sell or buy locally. Perhaps the seller and buyer can work out a trial period until the buyer becomes knowledgeable about the system.

Things To Remember When Buying or Selling

If you sell to someone at a distant location, you must ship the computer. If you have the original packing boxes, use them to pack the equipment. Be sure to use plenty of packing material inside. There is no sense having your working system broken in transit. When you advertise, be sure to state who pays for shipping. Very often, computer boxes exceed the UPS or parcel post size or weight limits. If that is the case, you may have to ship by air cargo and that can be expensive. Don't fail to insure the item for its actual value. If you don't state the value, you will find that the limit of the liability is around $50. Overstating the value, will not help because the insurer will determine the real value before they pay the claim.

If you are the receiver, be sure that you inspect the cartons for damage before signing for them. If there is the slightest sign of damage, sign only after bringing it to the attention of the trucker who delivers it and make a note on the documents you sign. Save the shipping cartons. You may need them to return the equipment to the seller or to a service depot.

If you buy a used computer or peripheral, write to the manufacturer and let them know that you are an owner of their machine. Not that you will have any claim on warranty service, but if you are listed as an owner, you may get service updates and notices of new improvements.

As soon as you receive the equipment, set it up and check it out. If anything does not work as represented, call the seller immediately and discuss it. Don't think you have been cheated. Computer equipment often has problems after shipping. Even brand new computers that have been inspected before leaving the factory arrive with misaligned disk drives or something else that quits enroute. People of goodwill can and do work out such problems. If you are the seller and your buyer calls you with a problem after receiving the equipment, consider having it repaired at his location at your expense. This is a bitter pill to take, but it may cost less than shipping the computer back, repairing it and sending it out again. If the damage is obviously from shipping, the receiver must make the claim. Do not waste any time doing this. It takes most shippers a long time to investigate your claim. You must be home when the investigator calls and you must have the original wrappings. Save the shipping papers. They are most important to your claim.

Don't Worry!

Although many of the things I say in this series of articles are negative, it is because I wish to warn you about them. Don't worry too much. Knowing what can happen enables you to deal with it so it does not happen. Thousands of people buy and sell through the pages of **Computer Shopper**, and we receive very few complaints. If you have any complaint from an ad in this magazine, write to our customer service department and we will try to help you. We can do more if the complaint is about a commercial ad rather than a classified but we will try our best for you. ●

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Editorial

By Stan Veit

The Macintosh Office

Editor's Note:
The Macintosh Office was announced the day our issue was ready for press. I have scrapped the editorial to bring you this important news.

Apple has introduced The Macintosh Office - where people can work together in the most productive ways possible.

On January 23, 1985 they announced the AppleTalk™ Personal Network and the LaserWriter printer. These two products are only the next step. Their strategy over the next few years is to introduce a series of products to meet the needs of work groups. Through these products they plan to achieve our long-term goal of establishing Macintosh as the second standard in a variety of business markets.

The concept of The Macintosh Office is built upon an understanding of how people in business really work. Research shows that knowledge workers spend about 80 percent of their time working closely with five to twenty five other people. The remaining 20 percent of the time, workers need to reach beyond this group. The Macintosh Office provides tools to let knowledge workers communicate within the work group and tie into outside information.

Products to Improve Productivity in Work Groups

At the heart of The Macintosh Office, of course, is Macintosh. The Macintosh family of products, built on the premise of power and radical ease of use, includes the entry-system Macintosh 128K; the more powerful Macintosh 512K, the Macintosh most frequently chosen by business users; and the Macintosh XL, for users who need more memory, a larger screen and a built-in hard-disk drive.

To really take advantage of the Macintosh hardware and software solutions, Macintosh users in work groups need to be able to communicate with each other. The AppleTalk Personal Network is a breakthrough in price/value that brings Macintosh radical ease of use to work groups.

Networks have been slow to catch on in business, mainly because they're too expensive.

AppleTalk changes all that. For a suggested retail price of only $50 a connection, AppleTalk allows Macintosh and other personal computers to share peripherals and lets up to 32 computers and peripheral devices communicate with each other within work areas of 1,000 feet. AppleTalk can act as a tributary to other networks for communication outside AppleTalk, and multiple AppleTalk networks can be bridged together to extend beyond 32 connections.

Apple's LaserWriter is a breakthrough in visual communication that brings to workstations a productivity tool never before available.

The LaserWriter is a high-resolution laser printer that can be shared in a work group to print such documents as newsletters, overhead transparencies, business forms, memos, brochures and reports. Through its dynamic built-in software language, PostScript, plus its built-in computer - the most powerful Apple has yet built - and a Canon LBP-CX10 engine, the LaserWriter produces text and business graphics with quality and flexibility previously restricted to printers costing several times as much. It prints characters and graphics in virtually any size at full-page 300 dots-per-inch resolution.

A built-in program emulates the Diablo 630, a popular daisy-wheel printer, letting IBM and IBM-compatible personal computers using IBM PC software print directly on the LaserWriter with no software modifications.

The file server, with

Continued on page 20

LINDENHURST by Corey Strongin

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Editorial

Continued from page 15

20-megabyte and 40-megabyte capacities, will be Apple's hard-disk electronic communication solution for work groups. It will have a built-in computer; software that provides file transfer, electronic mail and print-spooling; and built-in file-management software that will form the basis of multiuser applications to be developed by third parties.

The file server's design encourages development of both hardware and software products. It contains a standard SCSI peripheral interface to support hardware add-ons such as tape back-up and additional storage. Also, it uses the Macintosh operating system and development environment, making it easy for third-party software developers already familiar with Macintosh to write applications for the file server.

The Macintosh Office will be connected with the IBM world. It is necessary for Apple to connect with the IBM world at three strategic points: mainframe corporate data bases, System 36 and the PC/PC network level.

The Apple Cluster Controller provides a pathway between Macintosh and IBM networks based on bisynchronous or System Network Architecture (SNA) protocols. With either the Cluster Controller or with AppleLine, which emulates a 3278 terminal, the Macintosh family can talk directly to IBM in 3270 protocols.

Apple and third-party developers will provide gateways from AppleTalk into different IBM host computing environments, giving networked Macintosh users on AppleTalk the same access to mainframe information currently available to stand-alone Macintosh computers through MacTerminal, AppleLine and the Apple Cluster Controller. Also, Macintosh users will be able to exchange revisable documents with IBM systems through the DIA/DCA format.

To integrate the IBM PC into The Macintosh Office, Apple will provide an AppleTalk card for the IBM PC that puts it onto the AppleTalk network, with software to allow it to print on the LaserWriter and to use Apple's hard-disk file-server product. Additional software will let the IBM PC also be used as a file server itself and as a communications gateway into IBM's PC Network. ●

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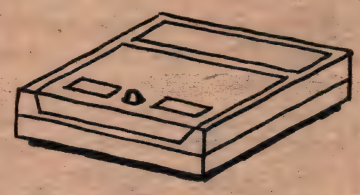

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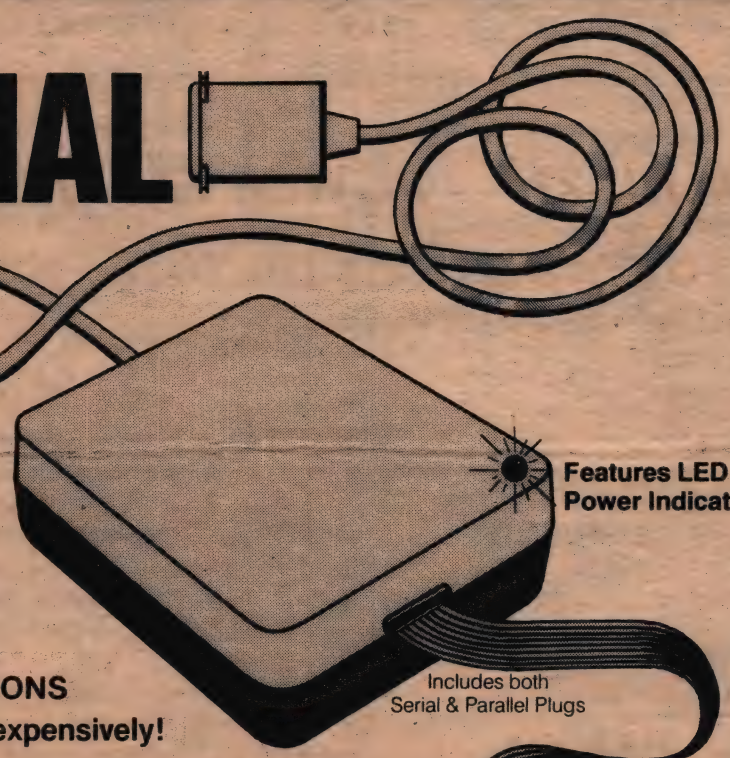

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FEEDBACK FORUM

Letters From Our Readers

To Editor of Computer Shopper:

I read with relish, your article in the February issue of Computer Shopper on the history of the micros. I have been an electronic hobbyist since I was 12 years old, and when computers became affordable to ME, the Exidy Sorcerer computer was completely assembled and my boss became a dealer and purchased 2! Yes, in 1978 we ordered 2 8K Sorcerer model I computers, which would run MITS and Altair programs, and even Sol programs with a few byte changes, etc.

Well, I've had one since June 1979, and now I have three! My main machine is a model II, circa 1981, and is attached to Exidy's own interpretation of the S-100 buss expansion unit with 6 slots. I run CPM 2.2, Spellbinder, dBASE II (ver 2.4), Supercalc, and have much CPM software and specific software written for this machine. I have an 8k Godbout static ram in the box, along with a Vector Graphic controller card, with Micropolis 16 sectored drives.

I don't know why you didn't even mention Exidy's Sorcerer computer, as they copied the MITS and Altair, and IMSAI scheme very closely. Except for the use of the Z80, which eliminated refresh problems with cheap dynamic ram, and the use of a better monitor program, and a full, real keyboard, this computer wasn't too much different.

Exidy was always more concerned with the making of commercial coin operated video games, but decided in 1978 to join the rest in creating a nice, cheap personal computer. In 1980, Exidy separated with the Data Products Division, and those who were responsible started Exidy Data Products, Inc., a separate company. Due to FCC regulations and marketing problems, Exidy Data Products, Inc. sold their stock to Challenge Computers in Richardson, TX.

Challenge was unsuccessful in marketing their computer which was similar to the Epson QX-10, and while they were liquidating Exidy stock, they went Chapter 11.

That's not the end of the story, as there are over 300 serious users of this machine in the United States, and about 500 more overseas. The rest of the buyers (Exidy claimed 20,000 worldwide), have no serious use for a computer, or have something else now.

Anyway, I just wanted to tell you that you left out a chunk of history in your editorial, that seems to be continually forgotten, never remembered, or simply neglected...The Exidy Sorcerer computer. I know it wasn't ever popular, but there are still a couple of user groups around that might disagree with you!

I used to call myself a 'hacker"—that meant a guy who had a computer that he could fix himself when it broke, and could modify a BIOS to work with his "non-standard" system, and even add printer buffers, sound and graphic boards to his system without outside help. I can't call myself a "hacker" now, as this means—"a teenage brat with no consideration for anyone else, who randomly accesses computers on line with intent to steal or defraud." So, Stan, I'm a 40 year old hobbyist, a professional video technician, a computer freak who likes his Exidy, CP/M and the S-100 buss, who will soon become a forgotten dinasaur, like the Altair!

Software and hardware pirates will always exist, ideas can't be controlled by copyright laws, and creative intelligence always rests on the success of others. There is no way to stop a person from thinking, other than simply killing him! Chances are, if that person is smart, he will tell someone else about the idea, and it will continue on.

Goodbye to the old "hackers," the readers of Popular Electronics, the Altair kit builders, the S-100 buss, CP/M, and the Exidy Sorcerer! Goodbye Microsystems magazine!

Hello to the IBM, 512KB user RAM, hard disks, and no more hassles about what the standard is! Goodbye Radio Shack, Atari, TI, Commodore, Coleco, and all the others who wish to bow out to the new standard of computers. Tandy might hang in there for a while while Taiwan, Korea, and Malaysia crank out IBM compatible clones.

The bottom line is that we primitive "hackers," and users determined the course of the

Continued on page 22

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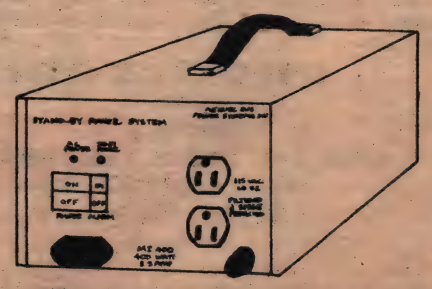

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Feedback Forum
Continued from page 21

companies that kept going. Even Apple, which got strong, is now submitting to the market which is heavily controlled by IBM.

WANG is getting cautious now, is not hiring more people, etc. It seems that they have to compete with those who can deliver the same hardware and support for less money! Wow! You think there's been a shakedown already? Just wait and see! In the meantime, I'll be content with running a dinasaur computer from another era. Why buy a Rolls Royce when all you need is a Chevy?

—Jack MacGrath
(No. Chelmsford, MA)

Yes, I did omit the Exidy Sorcerer. Perhaps it was because they were too painful for me. The man who brought out this computer was Paul Terrell, who also founded the BYTE Shops and gave Steve Jobs his first order. He told me about his new computer and signed me up as one of his first dealers. Computer Mart of New York received 20 computers and one expansion box. We never sold more than two machines because there was trouble with the serial port which also served as the cassette port. There were no plug-in cartridges and no CP/M for the expansion unit. Paul had shipped too soon in order to get accounts receivable on the books. The two machines we sold were used as cheap graphics terminals by a company doing type design. Eventually we hooked up a Micropolis as a disk drive and used their CP/M and BASIC. By then it was too late. The Apple II had become our main seller and pushed the SOL and Exidy into the background. When we went out of business, the Sorcerers in our basement were sold at auction for about $200 each!

The Sorcerer also had problems with the FCC due to the plastic case and RFI. This and the change in the market doomed one of the first true graphics oriented computers.

I also omitted the REX, the PUP and, most of all, the TDL XITAN ALPHA and GENERAL. Why has no one asked me about the digital group?

—Stan Veit

To Editor of Computer Shopper and Gene Bethold

UniForm-PC, by Micro Solutions, is more powerful than your review indicates. It allows the PC to USE CP/M data diskettes WITHOUT changing the data into its native format. Your February review misses this very powerful feature.

Let me give you a couple of how compatible it makes my son's Kaypro 4 with my IBM PC:

I wrote a basic program on the IBM to solve interest problems. Given three of the variables, it solves for the fourth: beginning balance, monthly payment, APR, and number of payments. It then gives you options to display and print an amortization schedule. Two minor modifications to the original resulted in a program, in CP/M format (only), that will RUN on both the Kaypro 4 and the IBM PC, in the magic "C" drive provided by UniForm PC.

I kept the Secretary/Treasurer's records for my Amateur Radio Club on my son's Kaypro during 1984, until he repossessed it. Using UniForm-PC, I can edit those WordStar generated records, save them in Kaypro format, and print reports—without EVER having them in PC-DOS.

—William F. Schmid
(Troy, Ohio)

Thanks for the information. Although we try to cover all bases in our software reviews, no reviewer can learn as much as a constant user of a program. I therefore invite our readers to share their experiences with all of us.

—Stan Veit

To Editor of Computer Shopper

Originally, I wrote to you not knowing about your publication and asked for a sample. I had received your address from another magazine. You kindly responded with a copy of the November issue.

Well, I read the magazine from cover to cover, and enjoyed it so much I immediately sent you a check for a year's subscription. My second issue arrived yesterday and I enjoyed it even more. I have already ordered materials from your advertisers and, yes, I did mention that it was because of their ad in Computer Shopper.

The purpose of this letter is to respond to your request for comments and/or recommendations. Since I am still a neophyte in the computer world, I would like to see either a column or an article in each issue directed toward the NEW computer buyer or user. Items that seem simple to the initiated are difficult for US to understand. Maybe items like CP/M vs DOS could be discussed in simple terms and even the differences between CP/Ms like 2.2 vs 86 etc., and DOS differences MS-DOS vs others. There could also be an article on Public Domain Programs, accessibility, use and availability.

Another area of question in my mind is the difference between the many and varied microprocessors now being used like the Z80, 8088, 8086, and numerous others. A brief explanation would be helpful.

You need a listing of free publications available in the areas of interest for computer buffs. I feel sure that there are many advertisers who would commit to a program of providing free materials to obtain addresses of interested people. It would be a service to the advertisers and enhance your publication.

One last recommendation: Since the issue I recently received is the Fifth Anniversary Edition, it would be great to make that issue more special by providing a comparison chart of all the small computers on the market at that time showing sizes, costs, and comparing capabilities... maybe even giving them a subjective rating. It is really difficult to pick out the differences between computers as applied to the needs of the buyer AND the availability

Continued on page 24

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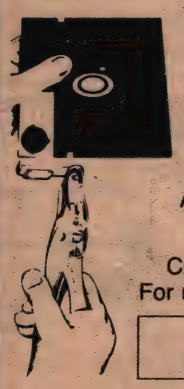

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Feedback Forum
Continued from page 22

and cost of software.

—H.D. Mann
(Columbia, SC)

Your kind comments are very much appreciated. We did run a series for beginners by Cheryl Peterson but the response to it was not encouraging to more articles of this type. Perhaps one discussing the topics you ask about would be better received. Many of the questions you ask about are already being answered in Computer Shopper. For example, Bill Chin's column and listings of Public Domain Software will help you a great deal. If you have questions about various microprocessors, no one can give you better answers than Mr. Chips himself, Don Lancaster. His HELP! column starts this month. Please use it to educate yourself and others. There is nobody we want to please more than our new subscribers.

—Stan Veit

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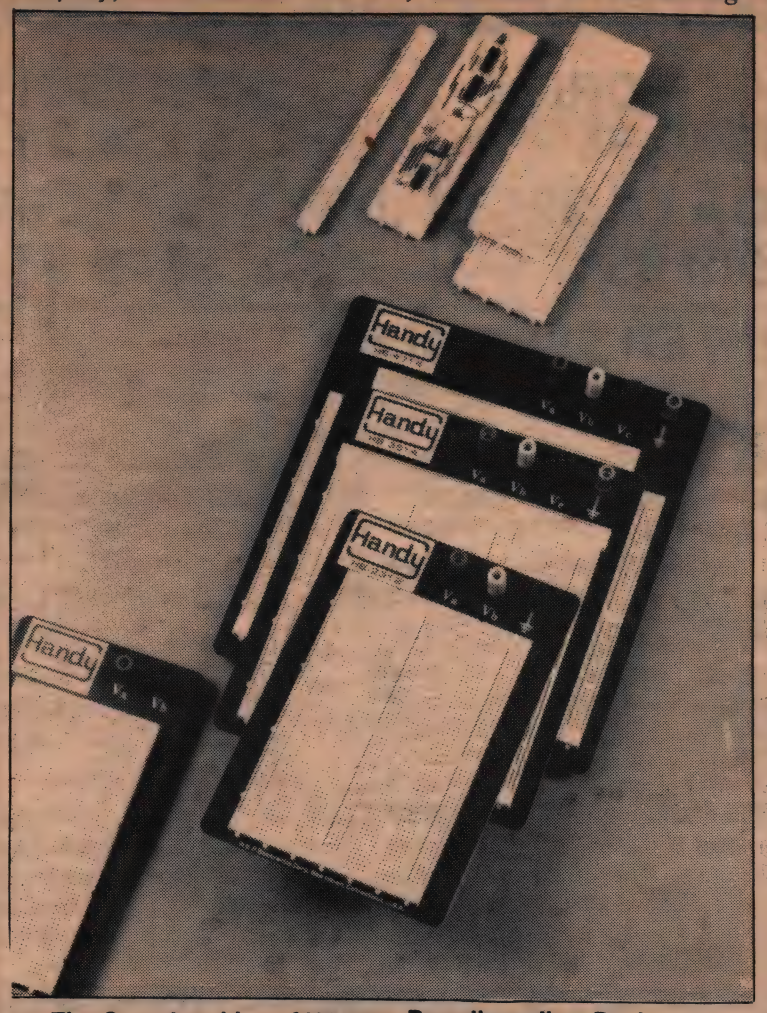
Handy Microprocessor Breadboarding Devices

RSP Electronics Corp., Branford, CT, a newly formed company, introduced HANDY Products, an expanded line of eight (8) low cost, high quality solderless breadboarding devices designed specifically for computer software and hardware test and circuit building.



The Complete Line of HANDY Breadboarding Devices

HANDY further announces that prices on all eight products are up to 25% lower than any other comparable breadboarding products made today. According to company officials, these versatile devices offer features not available on any other breadboarding products. They are completely compatible with any computer made today. All sockets are clearly marked and each contact group is clearly labeled on the surface. Mechancial interlocks provide secure interconnection horizontally or vertically. Units cannot warp and several models feature a detachable ground plate.

HANDY's Basic HB-0100 Buss Strips contain 4 groups of labeled contact points (25 per group), providing multipoint distribution for Vcc, ground and signal paths. HB-1000 socket offers 64 groups of 5 contacts each, labeled from 1-64 and a-j.

Model HB-1210 combines one socket and one buss strip for a big nine 14-pin DIP capacity, while Model HB-1110 features one socket and two buss strips. Each features a removable ground plate.

HANDY's line also includes four mounted board configurations. Model HB-2112 features 2 sockets, 1 buss strip and two binding posts on an 8.7"x5.4" aluminum ground plate with 18 14-pin DIP capacity. Model HB-2313 includes 2 sockets, 3 buss strips and 3 binding posts; while HB-3514 offers 3 sockets, 5 buss strips and 4 binding posts for a 27 14-pin DIP capacity. The largest, Model HB-4714 includes 4 sockets, 7 buss strips and 4 binding posts to create a giant 36 14-pin DIP capacity. All arrays are mounted on heavy aluminum ground plates with rounded corners and rubber feet to protect work surfaces.

All are in stock and available for off-the-shelf delivery. A complete, illustrated catalog is available by contacting RSP Electronics Corp., HANDY Products Division, 7 Business Park Drive, Post Office Box 699, Branford, CT 06405; Telephone 1-800-34-HANDY. (Connecticut, Alaska and Hawaii call (203) 488-6603).

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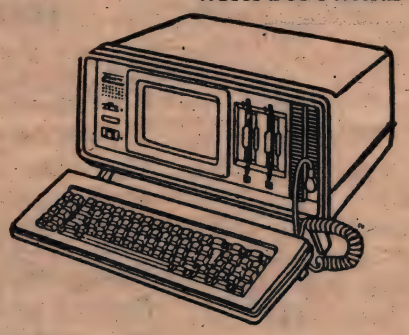

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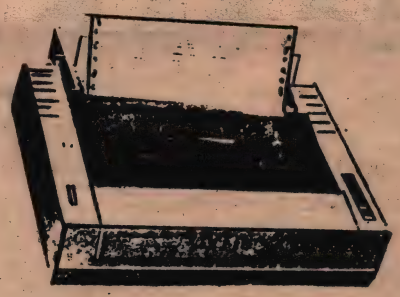

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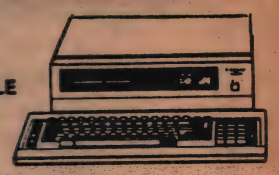

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COMMODORE

Commodore Launches New Line

by Computer Shopper Staff

Commodore International has introduced a complete new line of computers and peripherals at the Winter Consumer Show in Las Vegas. This post-Tremiel line is well thought out and finally answers the need for an upgrade machine to the C64. There are thousands of Commodore 64 owners who would like to move up to a computer with more memory and faster operation without sacrificing their investment in software.

The new Commodore 128 provides compatibility with all Commodore 64 peripherals and over 6,000 software programs. In addition, the 128 is completely CP/M compatible, providing the ability to run such standard software as WordStar, dBaseII, The Perfect series of programs and thousands of public domain programs.

The Commodore 128 is housed in an attractive, light beige case, and has a 92-key typewriter-style, upper/lower case keyboard with a 14-key numeric keypad. There are 8 programmable function keys, 6 cursor keys, a HELP key, 40/80 column key, no scroll key, ESCAPE key, ALT. key and a CAP LOCK key.

Will the real Commodore 128 stand up! Although Commodore has brought out "128" machines in the past, here it is—the true Commodore 128 computer. It should be a winner if the price is right and they ship when they say they will. Read the descriptions of the 128 and the Portable 128 and try one at your local dealer when he gets it.

The case measures 2.2" high by 17.02" wide by 12.7" deep and weighs 5 lbs. 6 ozs. There are 10 types of Input/Output connections:

User Port/Serial Port
Cassette Port/2 Game Ports
RF/TV Port/Cartridge Port
Audio Input/Audio Output
Composite Video/Digital RGB Video

The Commodore 128 comes with 128K of RAM memory and it is expandable to 512K RAM. Expansion may be accomplished by user-insertion of RAM disk modules.

There are three operating modes in the Commodore 128K, providing the widest range of operating choices for the user. First, there is the 64 Mode which uses the same 6510 microprocessor used in the C64 computer. The wonderful 6581 SID sound interface chip is also in the 128. This will allow the 128 to use all of the music keyboards for the C64 which are now coming on the market. In the 64 Mode there is 64K of RAM memory and 16K of ROM available with BASIC 2.0. The video is 40 characters by 25 lines with a resolution of 320 by 200. Sixteen colors are available with 8 Sprites.

Commodore 1902 Color Monitor, MPS 802 Printer and 1571 Disk Drive

The 128 Mode uses the 8502 microprocessor (6502 compatible) operating at 1 or 2 MHz. The 6581 SID chip is also available providing greatly increased music capability due to the large memory. The 126K of RAM is expandable to 512K using the RAM disk option. There is also 48K of ROM memory containing BASIC 7.0 and a machine language monitor. In addition, there is 16K of ROM for DOS support. In addition to the 40 by 25 video display used in the 64 Mode, there is also an 80 by 25 (640 by 200 resolution) display. The 40 by 25 video display also supports 16 colors and 8 Sprites.

Continued on page 26

Two For Tots

by Cheryl Peterson

Ernie's Magic Shapes
Big Bird's Special Delivery
CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2525

Suggested list $24.95

Availability:
Commodore 64, Atari, Apple II+, Apple IIe, Apple IIc, IBM PC and PCjr (disk, cassette and cartridge versions available where appropriate)

Henson Associates has lent several of its Sesame Street Muppet characters to CBS Software to help teach children about the concept of "same and different." The Children's Television Workshop Software Group has written two programs featuring Ernie (without his old pal and buddy Bert) and Big Bird and Little Bird. Each uses a slightly different approach, but both are effective.

As is usual for this type of software, the authors have underestimated youngsters. Though the packaging recommends the games for 3-6 year olds, two local 2-year olds are enjoying them tremendously. It takes a parent to get the program started (if the child is very young), but once it's running most kids will be enjoying themselves in no time.

The cartridge versions are especially easy to use. All that is necessary to get started is choosing the skill level, since the program autoloads when the computer is turned on.

There are many good things to say about these programs (keeping in mind this review was done using the Commodore versions). The graphics and sound are excellent on both. The actual design is tailored for pre-schoolers. Neither uses more than four of the keys on the keyboard. The simplicity of execution prevents youngsters from getting confused by too many choices to make.

Special Delivery

In Big Bird's Special Delivery, Little Bird and Big Bird are trying to get packages to their rightful owners. There are four shops with a person in the window of each. A picture appears in a large window of each shop. Big Bird gives a package with a picture on the outside to Little Bird. By using two arrow keys on the keyboard, the child moves Little Bird until he is under the shop with the same picture in the window. Pressing the UP ARROW key causes Little Bird to deliver the package to that shop. If the child is correct, the person in the window nods his/her head and the package appears in a window above the door; music plays, lights flash, and Little Bird moves out of the way for Big Bird to bring the next package. Pressing the RETURN key will get Big Bird to reappear bringing a new package. If the answer isn't correct, the head in the window shakes "No." The child can keep guessing until the right answer is chosen.

Cheryl Peterson examines software for our youngest computer users. Here, Big Bird and the Henson characters teach kids, while keeping them interested in computers.

There are two skill levels and two versions of the game. At the lower skill level, the pictures don't change until all four packages have been delivered. This lets the child use trial and error and the process of elimination, making it a little easier. At the difficult level, the packages all change each time one is delivered.

The easier version calls for exact matches of delivered packages. The tougher version calls for deductive reasoning to determine where the package should be taken. All of the items fall into fairly easily recognized categories: food, buildings, things to play with, plants, animals, etc. The child must figure out which kind of thing the picture on the package is and match it to one of the window pictures. Both skill levels are available for this game, too.

Ernie's Magic Shapes

Ernie's Magic Shapes concerns shapes and uses fewer keys than Special Delivery. Ernie is a magician of rare caliber. He conjures a shape, which appears above his head. Then he points to a table next to him and another shape appears. The child's task is to figure out whether or not the shape is the same. Pressing the

Continued on page 49

Commodore Launches
Continued from page 25

New for Commodore is the all out support for CP/M. This capability was promised as a plug-in option for C64 but its implementation took a long time and left a lot to be desired when it arrived. The Commodore 128 has CP/M built in with a Z80 co-processor running at 4 MHz. The CP/M version supported is CP/M Plus (Version 3.0). The 128K memory (expandable to 512K) is available in the CP/M Mode. The video display is either 40 by 25 or 80 by 25 with 16 colors.

Although the 128 is fully compatible with C64 peripherals, Commodore has developed a number of improved units for the new computer. The most important is the 1571 single floppy disk. No one who has ever used a 1541 drive would ever expect a serious computer system to use its slow access and transfer speeds. Commodore has provided the improved 1571 double-sided drive with 360K of formatted storage. In the C64 Mode it operates at an average speed of 300 CPS. In the 128 Mode it operates at an average of 2000 CPS, and it is also capable of reading most CP/M formatted programs. Realizing that most 128 productivity applications will use more than one drive, Commodore 1571 provides for daisy changing on extra drives and other peripherals.

Two new video monitors have also been introduced with the 128. The Commodore 1901 is an 80-column monochrome monitor suitable for word-processing, database applications and spreadsheets. The 1902 is a combination RGB/Composite Video monitor. The 1902 supports both 40- and 80-column color displays and will display VCR output. It requires no special cables or interfaces.

After having pioneered the low cost modem field with the Vicmodem, Commodore has introduced two new plug-in modems that can be used both with the 128 and C64/Plus 4 computers. The Commodore 1660 Modem/300 is a direct-connect 300 baud Hayes-compatible modem that features auto-answer, auto-dial and a built-in speaker. The 1670 Modem/1200 is a 300/1200 baud version with auto-answer, auto-dial and parity with auto-baud provisions so if there are problems on the line at 1200 baud, the modes automatically fall back to 300 baud operation. There is also a built-in speaker. Either rotary or touch-tone dialing may be used.

Mouse input is new for Commodore but it has become common on Apple and IBM PC computers. The Commodore Mouse gives the user the ability to control the cursor and to select menu options without having to type commands. It also can "paint" pictures on the screen using brush-like strokes.

The MPS 802 printer is a bi-directional that prints upper/lower case letters with true descenders in an 8 x 8 matrix. It also prints all PET graphics. It has a 60 CPS print speed and a 80-character print line. The MPS 803 printer is a less expensive printer with many of the features of the MPS 802. It, however, uses a 6 x 7 dot matrix which is a lower resolution than the MPS 802. For many users, it should fill the bill for a dot matrix printer.

Recognizing the need for applications software for the 128 beyond the scope of C64, Commodore has provided versions of some of the most popular application software systems mentioned above. In addition they have introduced JANE 2.0 for the Commodore 128. JANE 2.0 is a powerful icon-based integrated software system that is easy to learn and easy to use. It features JANEWRITE, JANECALC and JANELIST™ as part of the system that is operated with a Mouse or joystick. Each command is addressed as a series of pictures called icons. Everyday objects such as scissors and glue for "cut and paste"and a camera for "copying" make this program very easy to use.

The Perfect line of programs has enjoyed great success in the

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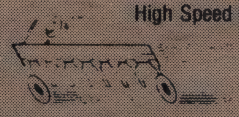

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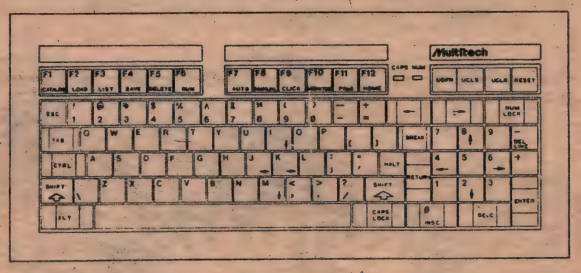

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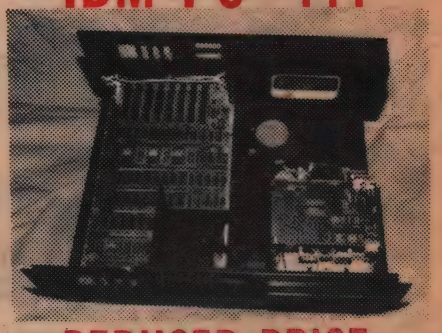

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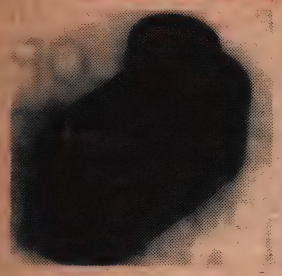

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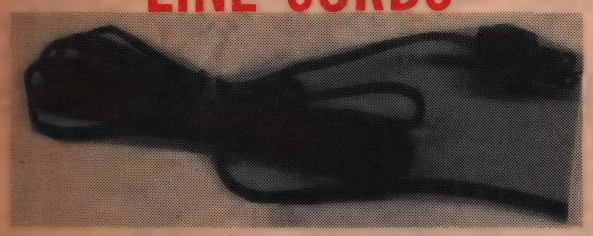

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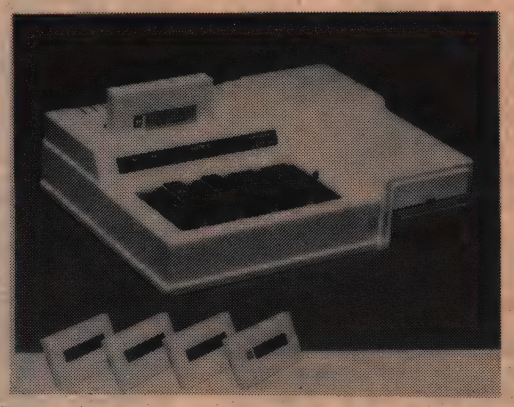

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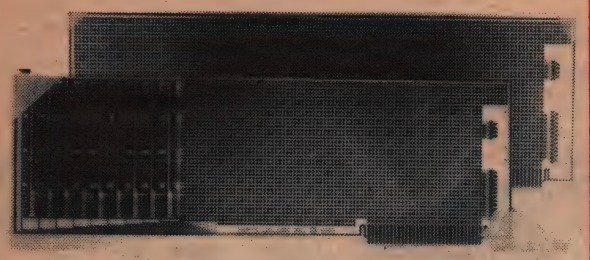

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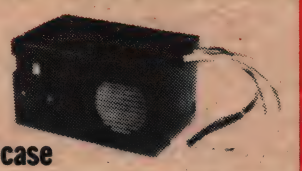

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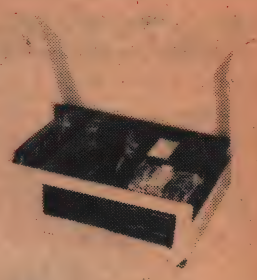

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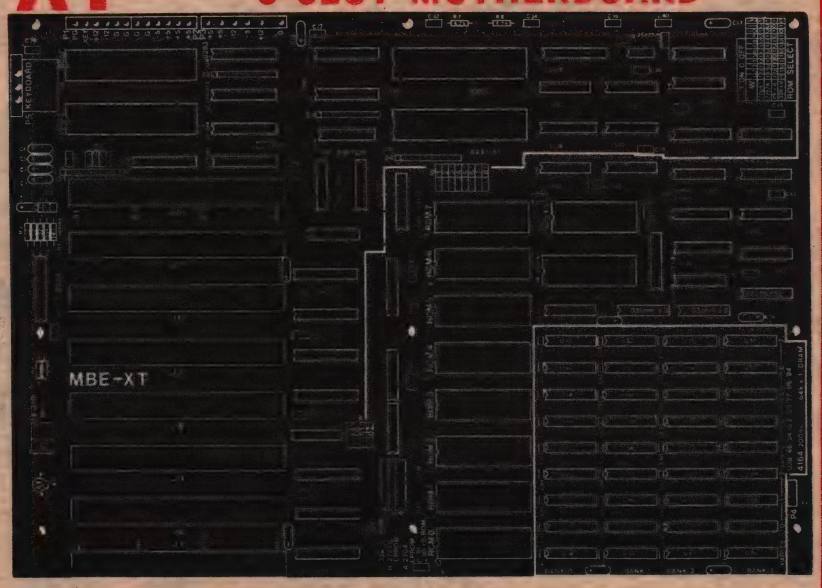

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COMPUTER PARTS GALORE COMPUTER PARTS GALORE COMPUTER PARTS GALORE COMPUTER PARTS GALORE COMPUTER PARTS GALORE COMPUTER

Commodore Launches
Continued from page 26

MSDOS market, it now has been ported to the Commodore 128 for use in the CP/M Mode. The series is composed of Perfect Writer, Perfect Calc, and Perfect Filer. Each features pop-up menus, split screens and automatic formatting for printing. These programs will provide interim software until the mass of CP/M software is converted into Commodore 128 format, a process that is not expected to take very long.

Commodore Introduces New LCD Computer

Although Commodore has built transportable computers they have never made a true portable before. They are now introducing the LCD computer which is a very powerful portable with an 80-character by 16 line LCD screen and CMOS memory and CPU chips. The display is large, bright and very easy to read and folds over the top of the unit when not in use to form a cover. The unit weighs only 5 lbs. 5 ozs. and is 2.1" high by 10.5" wide by 11.7" deep.

The keyboard is full-sized and has an excellent "feel" for typing. It has 72 keys plus 8 programmable function keys and four cursor control keys.

The display has a resolution of 480 by 128 dots for graphics and full upper/lower case alphanumerics. It is very easy to see from most angles.

The LCD computer has a built-in 300 baud modem with modular phone jack for direct connection to the phone line. Other I/O connections include a serial I/O port, an RS-232C port, a Centronics-type parallel port, an expansion port and an H.P. Bar Code Reader port.

Commodore has provided a full deck of applications software for the LCD computer. These include word processing, file manager, spreadsheet, address book, scheduler, calculator, memo pad, terminal emulator, BASIC and Monitor. A terminal emulator is also part of the "firmware package."

An important part of any portable is the power requirements. The LCD computer runs on 4AA Alkaline cells drawing 500 milliwatts. The batteries will last for 15 power hours under normal conditions. The memory backup consists of built-in NiCads. An AC adapter is included.

Continued on page 32

Commodore 128 Computer

Commodore LCD Portable Computer

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Commodore Launches
Continued from page 31

The internals of the LCD computer are operated by a 65C102 CMOS microprocessor running at 1 MHz and 32K of CMOS RAM and 96K of CMNOS ROM.

Conclusions About Commodore's New Releases

The theme of Commodore's booth at the Winter CES Show was "Bad News For IBM and APPLE." By this, Commodore was sending the message that the world's largest home computer company was moving up to compete in the PC marketplace.

The new computers are the vehicles for Commodore's thrust into the business market in the United States, a market where they have never been very successful. There are many reasons for this including the lack of a reliable dealer base to service this market. Everytime Commodore started to build this dealer base, it was cut out from under them when Commodore sold to the mass market at lower prices than the dealers could get. The net result was that Commodore dealers who sold to businesses dropped the line. Commodore's strength in this country has been in the schools and in home computers where they dominate the industry. Now they hope to keep the C64 base while they build the 128 user community. The machines are good enough to do just that. Although they are 8-bit'ers in 16-bit time, they have the software and peripheral support to win a lot of customers. Now there is one most important factor I have not even mentioned (have you noticed?). HOW MUCH DO THEY COST? Well you may hear about it by the time this comes out, but right now I do not know! Commodore did not release the price of any of the new products at CES or when we called them a week later. We have heard rumors of $600 for the Commodore 128 and $500 for the LCD computer but this is just someone's guess. The whole sales program depends upon offering a whole lot for a small price. Nothing less will lure buyers from IBM, The Clone Makers and Apple. As they say in China, "We Sure Live In Interesting Times." One more important question, "When can I buy one?" The answer to that one is "in the spring of 1985." ●

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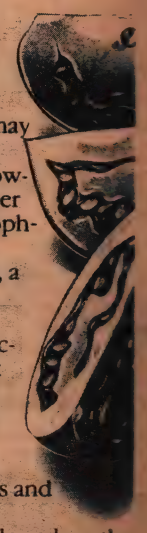

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Foods that may help reduce the risk of gastrointestinal and respiratory tract cancer are cabbage, broccoli, brussels sprouts, kohlrabi, cauliflower.

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Inside The VIC-20/Commodore 64

KERNAL File Handling

by Ted Drude

(A late addition: Don't miss the Commodore 128 article in this issue! I mentioned rumors about it last month. As we went to press, Commodore made an official announcement. We'll have more comments and details later!)

More On KERNAL File Handling

This month we will be using the KERNAL to OPEN I/O files with filenames. This includes tape, disk, RS-232 serial channels. But first...

Thanks For Your Response! It Has Been Great!

My appeal for reader feedback has resulted in a deluge of cards and letters from a lot of you Commodore fanatics out there! I want to thank each and every one of you who took the time to write and let us know what you think about the "INSIDE" series and where you would like to see it go. I assure you that if you have taken the time to write me, you will get a personal response (it may be a postcard, though, unless you have included a SASE). It may take a while, but your patience will be rewarded.

If you haven't already written, please send a note to me (Ted Drude) c/o the **Computer Shopper** (P.O. Box F, Titusville, FL 32781). Let us know what you like/dislike about this series and our Commodore coverage in general. We really appreciate your involvement! It will help make the **Shopper** better able to serve your needs.

I'll be mentioning some of the letters and feedback we've received a little later in this article. But first, we want to take up where we left off in the KERNAL:

OPENing a File With a Name

Last month we saw a simple Assembly routine to OPEN an I/O channel that doesn't need a name. A I/O channel to the keyboard, screen, or printer are examples.

Some I/O channels, however, obviously need a filename. Tape, disk, and RS-232 channels typically need a filename for reference. The RS-232 port requires a "name"-type parameter when it is open to set up the proper communication routines. So, how does the OPEN procedure differ when using a filename?

Let's quickly review the basic OPEN procedure from the KERNAL:

1) Call SETLFS ($FFBA) to set up the logical number and second address.

2) Call SETNAM ($FFBD) to set up the file name (if any).

3) Call OPEN to actually OPEN the file for I/O.

As you recall from last month, when we OPEN "nameless" I/O files, we load the Accumulator ("A") with a "0" (LDA #$00) when we called SETNAM. (See last month for the discussion as to why this is necessary.) This cancels the need to specify a filename when OPENing a channel. But sometimes, we need a filename, so we have to do things a little differently.

SETNAM is the routine that handles our filename for us. We have to set up certain "File Name Parameters" before we call SETNAM. Then, after calling SETNAM, our filename will be automatically managed by the KERNAL. It will be sent to the disk drive, tape, or serial port as needed. We can forget about the filename and refer to the file by its **channel number** (logical file number). All we have to do is to feed the right info. to SETNAM.

So, what are the "File Name Parameters" we have to send to SETNAM? Well, your trusty VIC or 64 Programmer's Guide lays it all out for you. Page 299 (64) or 204 (VIC) describes SETNAM in detail. We have to tell SETNAM two things about our filename:

1) The length of the filename in characters (this is put into the "A" register).

2) The starting address of the filename (this goes in "low"/"high" form in the "X" and "Y" registers).

You might be saying to yourself, "What is a starting and ending address of a filename?" Well, the address in "X" and "Y" (stored in "low byte"/"high byte" format) really is the starting address of where the filename is stored as an ASCII string in memory. If you wonder how a filename might get stored in memory in the first place, it's simple: you have to put it there! (Nothing that can be assumed with Assembly language. You have to do a lot of the "little" jobs that are often done "automatically" in higher level languages.)

OPENing a file with a filename is a good place to demonstrate the advantages of a "full" assembler over a "monitor" assembler. Writing an Assembly program to do the

Continued on page 37

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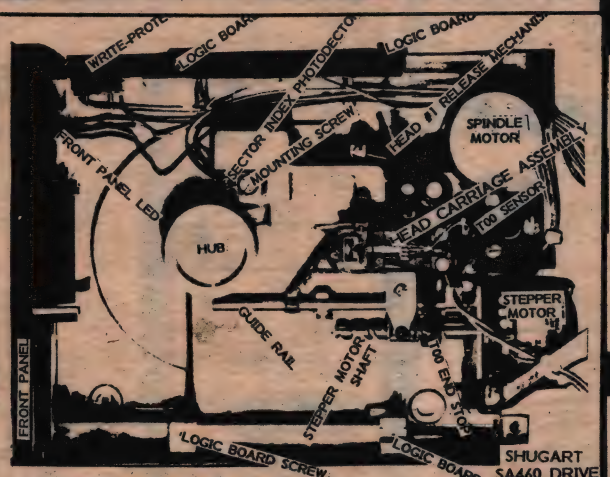

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The **SILKWOOD** detects X- and Gamma-Rays, and Alpha and Beta Particles. Radiation causes cancer, birth defects, mental retardation, sterility, cataracts, etc. The **SILKWOOD**'s advantages over other radiation detectors:

1) **NO GEIGER-MUELLER COUNTER TUBE IS USED!!** A commonly available, 25-cent electronic part is used as the receptor - 95%+ linear from 10 rads/min. to 1,000 rads/min.!

2) **NO HIGH VOLTAGE IS REQUIRED!!** Can be safely and easily operated from two 9-volt radio batteries.

3) **DESIGN IS SIMPLE!!** Only two ICs are used (same type). All parts cost about $30, and are commonly available or easily made. Pocket-size. Quiescent current is about 5 mA.

Have you been **SILKWOODED** in your job? Is your home radiating? Your children's school, nursery or playground? Many structures - even furniture - were built with materials that have radioactive minerals in them, and-or emit radioactive radon gas. Most basic building materials are never checked for radioactivity!

The **SILKWOOD**'s fascinating principles, design, construction and use are completely described and illustrated. **ONLY $7.**

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THE "GOLDFINGER" ☐
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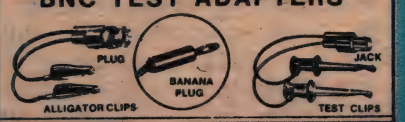
L-COM® Shopper's Guide

Products for the ELECTRONIC & COMPUTER Industry

SUPERIOR GRADE DIP-16 FLAT CABLES

MODEL-ft.	1-9	10-24	25
MLF16PP-0.5	3.30	3.00	2.84
MLF16PP-1	3.60	3.28	3.10
MLF16PP-2	4.20	3.82	3.61
MLF16PP-3	4.80	4.37	4.13
MLF16PP-4	5.40	4.91	4.64

BNC TEST ADAPTERS



MODEL	TYPE	TERMINATION	1-9
BC30	Plug	Banana Plug	7.75
BC40	Plug	Test Clip	8.95
BC50	Plug	Alligator	7.10
BC60	Jack	Banana Plug	5.75
BC70	Jack	Test Clip	6.95
BC80	Jack	Alligator	5.75

Order 10 each type - DEDUCT 10%

OUR SPECIALTY

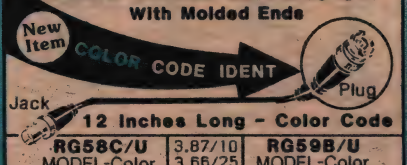
CUSTOM

RS-232 ADAPTERS

Few or OEM Qty

LET US QUOTE

BNC CABLE EXTENSION With Molded Ends



12 Inches Long - Color Code

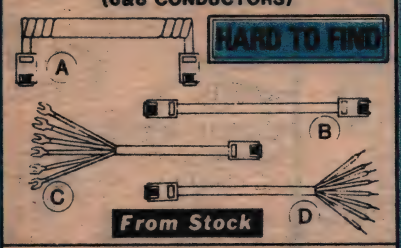
RG58C/U MODEL-Color	3.87/10 3.66/25	RG59B/U MODEL-Color
CC58CX-Blue	$4.25 Each	CC59BX-Blue
CC58CX-Green		CC59BX-Green
CC58CX-Orange		CC59BX-Orange
CC58CX-Yellow		CC59BX-Yellow

Color Mix OK for Quantity Pricing

PC Mounted BNC CONNECTORS —SILVER PLATED—

MODEL	TYPE	1-9	10-24	25
BAC-1422	PC	4.95	4.50	4.26
BAC-1500	RA	7.95	7.23	6.84

TELE-DATA CABLES (6&8 CONDUCTORS)



MODEL-ft.	Code	# Wires	1-9	10-24
TDC-001-6	A	8	3.95	3.48
TDC-001-10	A	8	4.95	4.36
TDC-003-2	B	8	2.95	2.60
TDC-003-7	B	8	3.55	3.12
TDC-003-14	B	8	4.85	4.27
TDC-003-25	B	8	6.95	6.12
TDC-027-7	B	6	2.95	2.60
TDC-027-14	B	6	3.85	3.39
TDC-027-25	B	6	4.95	4.36
TDC-004-7	C	8	2.95	2.60
TDC-004-14	C	8	3.95	3.48
TDC-028-7	C	6	2.55	2.24
TDC-028-14	C	6	3.45	3.04
TDC-005-2	D	8	2.25	1.98
TDC-005-7	D	8	2.95	2.60
TDC-005-14	D	8	3.95	3.48

Rotary-Scale Clamp-On Instruments

The most advanced Clamp-On Tester with many performance features • Range selection knob automatically advances the specific scale • Easy reading - no confusion • Accurate AC current measurements assured because of round clamp core with built in balanced coils • Most reliable taut band internal core magnet meter • Trigger lock device, retains reading for use in hard to get places • Automatic Zero Adjust ohms scale • Overload protection up to 150% for one minute ON ALL RANGES • Test leads lock in for added safety • Accuracy +3% full scale on all ranges • Accessories included carry case, test leads and instructions • Size 8.25x3.25x1.4" • Reasonably priced

10 USEFUL RANGES	
AC Current	6, 15, 60, 150, 300, 600A
AC Voltage	150, 300, 600V
Resistance	0-20kΩ(1kΩ center scale)

Price Cut 65%

57.95/ea 47.60/10
55.55/3 42.85/25

Reg. $119.00

THIS MONTH'S SPECIAL!

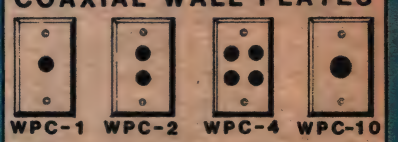
BRUSHED STAINLESS WALL PLATES

Blank MODEL WP $3.59
Supplied with Matching Screws

D-SUB WALL PLATES

MODEL	Knockout	1-9	10-24
WPD-1	(1) D-25	3.95	3.75
WPD-2	(2) D-25	3.95	3.75
WPD-3	D & Coax	3.95	3.75
WPD-4	D & Coax	3.95	3.75

COAXIAL WALL PLATES



WPC-1	(1) Coax	3.95	3.75
WPC-2	(2) Coax	3.95	3.75
WPC-4	(4) Coax	3.95	3.75
WPC-10	IBM Twinax	3.95	3.75

NOTICE: Wall plates have D-Holes to accept feedthru adapters as shown below. Prices are for plates only.

TELE DATA JACK 6&8 POSITION

MODEL	TYPE	POS.	1-9	10-24
TDD-22	Wall	8	7.50	6.60
TDD-26	PC	6	2.95	2.60
TDD-28	PC	8	3.95	3.48

MALE D-SUB HARDWARE

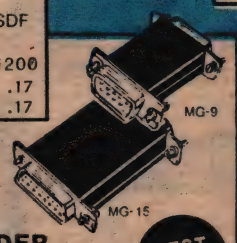
STD 4-40 SET

COMPARE PRICES

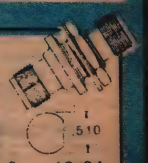
COMPARE

Multiples of 50 Only

MODEL	FINISH	50-450	500	1200
SDF-1	Chromate	.19	.18	.17
SDF-2	Tin Plate	.19	.18	.17



CONNECTORS FOR L-COM WALL PLATES



MODEL	TYPE	1-9	10-24
BA-1087	BNC	6.25	5.94
BA-2301	TNC	6.45	6.13

RS-232 D-SUBS

SD-25P2	Male	3.65	3.47
SD-25S2	Female	4.85	4.61

DATA COAXIAL SWITCH

- Rugged Build
- Fully Shielded
- AB or ABC Types
- Low Contact Res
- Mounting Flanges
- Metal Construction
- BNC or TNC & Wang
- Center conductor switches
- Shield isolation maintained

MODEL	FUNCTION	TERM.	EACH
DS12B	SPDT AB	BNC	65.00
DS22B	DPDT AB	BNC	79.00
*DS22BT	DPDT AB	BNC-TNC	85.00
DS13B	SPDT ABC	BNC	75.00
DS23B	DPDT ABC	BNC	94.00
*DS23BT	DPDT ABC	BNC-TNC	99.00

*For Wang Devices-Switches Transmit & Receive Cables Simultaneously

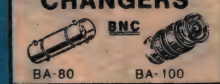
Qty. Discounts & Custom Types Available

RS-232 CABLES 25 CONDUCTORS

MODEL-ft.	1-9	10-24
C25-2.5	19.88	18.09
C25-5	21.16	19.26
C25-10	23.76	21.62
C25-15	26.36	23.99
C25-25	31.56	28.72

SPECIFY: Male-Male or Male-Fem

- POPULAR - GENDER CHANGERS



MIX 10 $2.80
MIX 25 $2.60

YOUR CHOICE 2.95

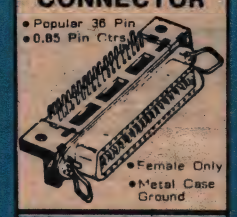
GENDER CHANGERS

BEST GRADE

MODEL	GENDER	1-9	10-24
MG-9F	F-F	15.95	14.51
MG-9M	M-M	15.95	14.51
MG-15F	F-F	18.95	17.24
MG-15M	M-M	18.95	17.44

CENTRONICS RT ANGLE PC CONNECTOR

- Popular 36 Pin
- 0.85 Pin Ctrs



- Female Only
- Metal Case Ground

SCARCE ITEM

CEN36F-RA

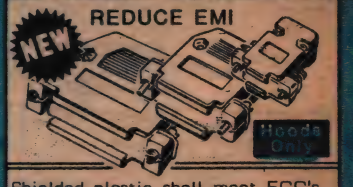
1-9	10-24	25
8.95	7.88	8.50

DEALER REQUESTS ATTENDED

RG59B COAX CABLES with UHF Connectors on both ends

MODEL-ft.	1-9	10-24	25-99
CB59B-1	3.55	3.23	3.05
CB59B-1.5	3.70	3.37	3.18
CB59B-2	3.85	3.50	3.31
CB59B-3	4.15	3.78	3.57
CB59B-4	4.45	4.05	3.83
CB59B-5	4.75	4.32	4.09
CB59B-10	6.25	5.69	5.38
CB59B-15	7.75	7.05	6.67
CB59B-25	10.75	9.78	9.25
CB59B-50	18.25	16.61	15.70
CB59B-100	33.25	30.26	28.60

METALIZED CONNECTOR REDUCE EMI

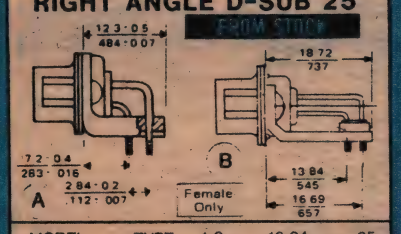


Shielded plastic shell meet FCC's Class B. Solves interference problems. Designed to reduce the cost and weight. The compucable shell is made of fire resistant plastic (UL94VO) and is plated with copper for shieldeing and then with nickel: **All hardware included**

MODEL-SIZE	1-9	10-24	25
SDC- 9M	1.75	1.66	1.54
SDC- 15M	1.85	1.76	1.63
SDC- 25M	1.95	1.85	1.72

Supplied w/hdr - QTY pricing also

RIGHT ANGLE D-SUB 25



MODEL	TYPE	1-9	10-24	25
SD25S-RA	A	7.90	7.51	6.95
SD25S-R2	B	7.90	7.51	6.95

GENDER CHANGERS

BEST GRADE!

MODEL	GENDER	1-9	10-24
MG-25F	F-F	23.95	21.79
MG-25M	M-M	23.95	21.79

ATTRACTIVE Prices for QTY Users

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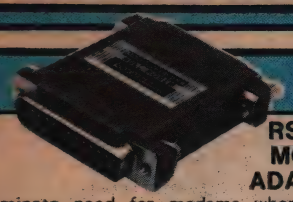
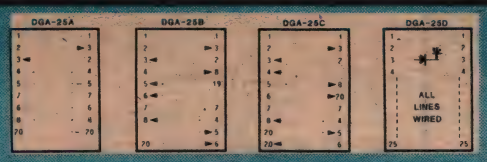


RS-232 MODEM ADAPTERS

Eliminate need for modems when connecting local terminals or terminal to computer. Construction is the same as our DG Series. Pin connections are shown in the code diagrams. If our standard won't do, we will configure to your specifications.

MODEL	DESCRIPTION	1-9	10-24	25
DGA-25A	Null Modem	16.95	15.42	13.65
DGA-25B	Null Modem	16.95	15.42	13.65
DGA-25C	Null Modem	16.95	15.42	13.65
DGA-25D	Polarity Changer	16.95	15.42	13.65



RS-232 GENDER CHANGERS

Needed when RS-232 cables won't mate. Our DG Series are compact and feature trouble free PC Board construction and lower cost. Choice of shielded or unshielded. Keep some for emergency needs.

MODEL	GENDER	1-9	10-24	25
DG-25F	(F-F)Unshielded	16.95	15.42	13.56
DG-25M	(M-M)Unshielded	16.95	15.42	13.56
DGS-25F	(F-F)Shielded	18.65	16.97	14.92
DGS-25M	(M-M)Shielded	18.65	16.97	14.92

RS-232 DATA LINE MONITOR

A miniature Data Line Monitor allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and dedicated Red LED's report the status of:

Transmit Data (TD) pin 2
Receive Data (RC) pin 3
Request To Send (RTS) pin 4
Clear To Send (CTS) pin 5
Data Set Ready (DSR) pin 6
Data Carrier Detect (DCD) pin 8
Data Terminal Ready (DTR) pin 20

LED's glow at 3V & draw only 3 MA at 12V

MODEL	DESCRIPTION	1-9	10-24	25
DLM	Data Line Monitor	37.35	33.99	29.88

RS-232 SIGNAL CHANGER

A unique Switch Box that allows any I/O combinations

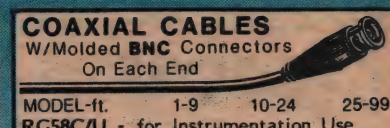
When re-configuring terminal or modems, wiring must be altered to handle I/O signals. These changes could be frustrating. An RS-10 can do it easily, simply move the dip switches to open, close or even crossover lines. Supplied with 12 ft. cable with RS-232 Male terminations.

RS-10.....99.00 2 or more.....88.00

Qualified Dealers **WANTED** Call Mark Tomkins for Details

COAXIAL CABLES

W/Molded **BNC** Connectors On Each End



MODEL-ft.	1-9	10-24	25-99
RG58C/U - for Instrumentation Use			
CC58C-1	3.55	3.23	3.05
CC58C-2.5	4.10	3.73	3.53
CC58C-5	4.65	4.23	4.00
CC58C-10	6.05	5.51	5.20
CC58C-15	7.45	6.78	6.41
CC58C-25	10.25	9.33	8.82
CC58C-50	17.25	15.70	14.84
CC58C-100	31.25	28.44	26.88
RG59B/U - for Video & General Use			
CC59B-1	3.65	3.32	3.14
CC59B-2.5	4.00	3.64	3.44
CC59B-5	4.75	4.32	4.09
CC59B-10	6.25	5.69	5.38
CC59B-15	7.75	7.05	6.67
CC59B-25	10.75	9.78	9.25
CC59B-50	18.25	16.61	15.70
CC59B-100	33.25	30.26	28.60
RG62A/U - for Computer Applications			
CC62A-1	3.60	3.28	3.10
CC62A-2.5	3.95	3.59	3.40
CC62A-5	4.70	4.28	4.04
CC62A-10	6.15	5.60	5.29
CC62A-15	7.60	6.92	6.54
CC62A-25	10.50	9.56	9.03
CC62A-50	17.75	16.15	15.27
CC62A-100	32.25	29.35	27.74
RG174U - for General Use			
CC174-1	3.60	3.28	3.10
CC174-1.5	3.75	3.41	3.23
CC174-2	3.90	3.55	3.35
CC174-2.5	4.05	3.69	3.48
CC174-4	4.50	4.10	3.87
CC174-5	4.80	4.37	4.13
CC174-10	6.35	5.78	5.46
CC174-15	7.90	7.19	6.79
CC174-25	11.00	10.01	9.46
CC174-30	12.55	11.42	10.79

IBM-PC PRINTER CABLE

Molded RS-232 to Centronics. This popular cable mates IBM-PC's. Available in two lengths.

IBM-PC T.M.

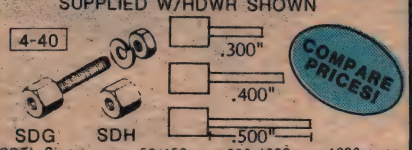
MODEL	FT	1-9	10-24	25
CMX6-IBM	6	39.95	36.35	34.36
CMX12-IBM	12	44.95	40.90	38.66

CUSTOM CABLES On Special Order

PIN	OUT
1	1
14	14
15	32
16	31
17	36
18	33
19	19
20	21
21	23
22	25
23	27
24	29
25	30

RS-232 LOCK-DOWN SCREWS

SUPPLIED W/HDWR SHOWN



MODEL-Size	.50-450	500-1200	1200-over
SDG-300	.18	.17	.16
SDG-400	.19	.18	.17
SDG-500	.20	.19	.18
SDH	.11	.10	.09

NOTICE: Multiples of 50 Only

IF YOU DON'T SEE IT We probably have it in stock or we could make it for you.

PARALLEL (Centronics) GENDER CHANGERS

Mates Centronics parallel printer cables that are of the wrong sex. All 36 pins are wired through. Bright metal construction. Mating Centronics cables are shown below.

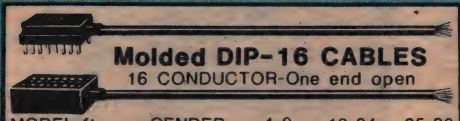
MODEL	GENDER	1-9	10-24	25
DGS-36F	Female-Female	36.95	33.62	29.56
DGS-36M	Male-Male	36.95	33.62	29.56

CENTRONIC SOLDER-POT CONNECTORS

MODEL	Use With	1-24	25-99
CEN-36PC	Rnd Cable	7.95	7.00
CEN-36PF	Flat Cable	7.95	7.00
CEN-36PN	Panel Mt	6.95	6.12
CEN-36SC	Rnd Cable	8.95	7.88
CEN-36SF	Flat Cable	8.95	7.88
CEN-36SN	Panel Mt	7.95	7.00

Molded DIP-16 CABLES

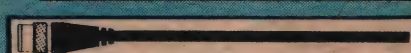
16 CONDUCTOR-One end open



MODEL-ft.	GENDER	1-9	10-24	25-99
ML16P-1	Male	3.95	3.59	3.40
ML16P-2	Male	4.25	3.87	3.66
ML16P-3	Male	4.55	4.14	3.91
ML16S-1	Female	3.95	3.59	3.40
ML16S-2	Female	4.25	3.87	3.66
ML16S-3	Female	4.55	4.14	3.91

RG59B/U COAXIAL CABLES

W/MOLDED **TNC** CONNECTORS on Each End



MODEL-ft.	1-9	10-24	25-99
CC59BT-2.5	5.75	5.23	4.95
CC59BT-5	6.50	5.92	5.59
CC59BT-10	8.00	7.28	6.88
CC59BT-15	9.50	8.65	8.17
CC59BT-25	12.50	11.38	10.75
CC59BT-50	20.00	18.20	17.20

CUSTOM COMPUTER CABLES — Made To Order —

CENTRONIC CABLES

FULLY **SHIELDED** - 36 CONDUCTORS

MODEL-ft.	1-4	5-9	10-24
CE36-5	30.50	29.28	27.76
CE36-7.5	34.25	32.88	31.17
CE36-10	37.50	36.00	34.13
CE36-15	44.00	42.24	40.04
CE36-25	57.50	55.20	52.33

NOTICE: **Specify Gender** M-M or M-F Cable with 2 CEN-36 ends

RS-232 SURGE PROTECTOR

Guard against voltage spikes entering your RS-232 ports. Metal-Oxide varistors on lines 2, 3, and 7 clamp surges above 26 volts without affecting normal operation. This compact adapter mounts permanently in series, all 25 lines are wired through.

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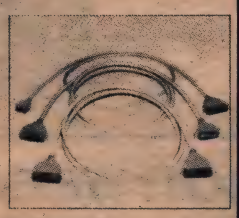

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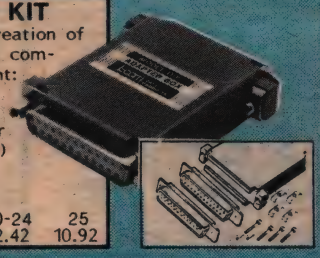

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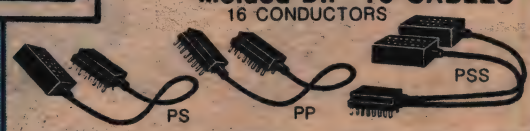

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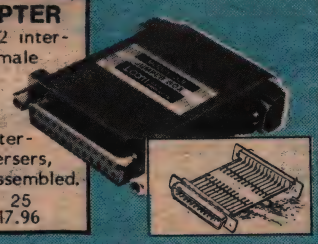

MODEL	DESCRIPTION	1-9	10-24	25
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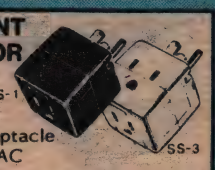

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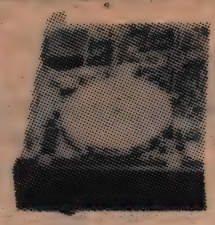

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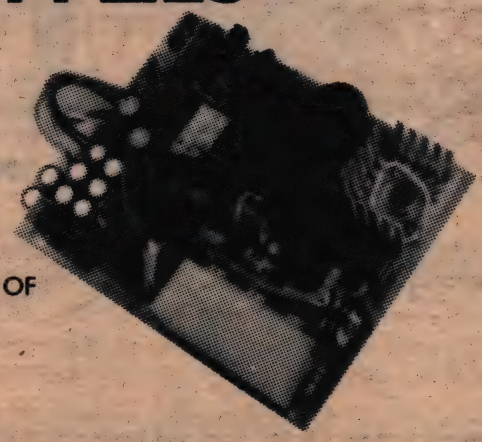

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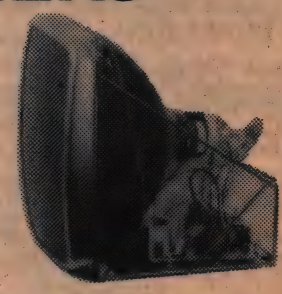

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Inside The VIC-20
Continued from page 33

job with most monitors is hard work. A full assembler almost makes it child's play. Let's compare how a KERNAL OPEN would be written with both a monitor and a full Assembler. (By the way, Don Lancaster's recent series on Apple Assembly Language in the Shopper is an excellent introduction to 6502 assemblers and can be of great benefit to Commodore as well as Apple users. Check it out!)

For example, let's OPEN a file on the disk drive. We want a SEQuential text file, name "TESTFILE", OPENed for a Write operation, so we can send characters to it.

Here is the BASIC syntax (I am assuming that the Command Channel (15) is already OPEN):

```
100 OPEN 8,8,8,"TESTFILE,S,W"
```

Now, let's do it with a "monitor assembler" like Supermon or Micromon:

```
.A 1000 LDA #$08
.A 1002 TAX
.A 1003 TAY
.A 1004 JSR $FFBA
.A 1007 LDA #$OC
.A 1009 LDX #$OO
.A 100B LDY #$11
.A JSR $FFBD
.A JSR $FFCO
```

Follow all that? Hope so! Now comes the fun part! The filename string buffer is arbitrarily defined at $1100, as you can see. I've got to go there and POKE in the ASCII value for each character in the filename string, including the commas (",") and the "S" and "W" for SETNAM to work properly. Anybody that has done much programming in this fashion will tell you that it is not fun. Using an ASCII/Character conversion chart, you find the right code for each letter, and then enter it by hand. Lot of chances for error and a slow process. (By the way, don't forget that Commodore uses "PETSCII" which is slightly different from ASCII and may further complicate things.)

With a full assembler, it's much easier. The Assembler does much of the work for you. Let's see what it would look like (I'm not including all the equates we saw last month. We'll just assume they are already in our source text):

In addition to being easier to write, full Assembly Source code is easier to modify and read, once you "catch on" to it. As you can see, by using a full Assembler, you've avoided the need to look up the ASCII string character code, the filename memory locations, or calculate the filename length. By using labels and the .BYTE pseudop the Assembler does it all for you. You can type the filename in as though you were entering, a BASIC statement. That can save a lot of time and effort. The comments and labels make the source code a lot more intelligible, too.

Now What?

Once an I/O file is OPENed, it becomes an I/O **channel**, and it's then fairly simple to send or receive data from it. You'll be seeing more examples of how this works in upcoming articles. Until then, I recommend that you follow procedures we have been using here to access the KERNAL. Read the Programmer's Guide reference, determine what you have to "set up" before calling a routine, and then follow the procedure outlined in the Guide to access it. You should be able to start writing simple Assembly routines using the KERNAL soon. Remember to use the Jump Table and all of your routines will be portable to boot!

(As a side note, many people are wondering which full Assembler they should buy. I have a couple recommendations.

If you want to get a cheap assembler to "play around with", you might consider the "Commodore Macro Assembler" for the 64. It's often discounted for under $20. It uses standard 6502 syntax and has some Macro capability. It also has some limitations that would keep me from using it daily, but it is more than adequate for occasional use.

If you plan on doing a lot of Assembly work, there are several ones on the market that would work just fine. I used to use the MAE assembler from Eastern House. It ran fine on the 8032, but it is not quite as well implemented on the 64. It's still usable, but not a whole lot better than the standard Commodore Macro Assembler. The Editor is nicer, though and it assembles much faster. It uses non-standard 6502 syntax that takes some getting used to.

My nomination for the best Commodore assembler is "PAL" written by Brad Templeton (available from Pro-Line Software, 755 The Queensway East, Unit 8, Mississauga, Ontario, Canada, L4Y 4C5 for $49.95). PAL is the overall champ when it comes to versatility, features, and performance. It's one of the easiest full Assemblers to use, yet has a lot of features, and it's powerful enough for the most demanding applications. If you do much serious work with Commodores at all, you owe it to yourself to check out PAL and its companion program POWER, a BASIC

Continued on page 38

```
        * = $1000           ;START AT $1000 (ARBITRARY)

;  SET THE LOGICAL #, SECOND ADDR., AND SPECIFY THE DEVICE #:

        LDA #$08            ;LOGICAL FILE #.
        TAY                 ;SAME DEVICE #.
        TAX                 ; "   SECOND ADDR.
        JSR SETLFS

;  SPECIFY THE FILENAME:

        LDA #CHREN-CHRBF    ;CALCULATE STRING LENGTH.
        LDX #<CHRBF         ;LOAD ADDR. BYTE.
        LDY #>CHRBF         ;HIGH ADDR. BYTE.
        JSR SETNAM

;  OPEN THE FILE AS AN I/O CHANNEL:

        JSR OPEN            ;GO OPEN THE FILE.

CHRBF .BYTE "TESTFILE,S,W"

CHREN   = *

        .END
```


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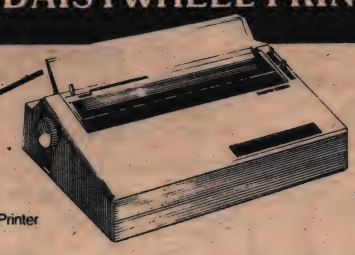

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Inside The VIC-20
Continued from page 37

extension utility.)

Now, More FEEDBACK From Our Readers...

The feedback from our readers has been generally positive (some very positive!). We've gotten a lot of ideas and suggestions from you, the readers, and we are evaluating those ideas now.

Most people said they felt this series was either "just about right" or a "little too technical" for the average user. Very few felt it was too simple. I've tried to keep things on the level of the "Programmer's Reference Guides", and hit the middle ground. It's natural for things to flow in the direction of chips, bits, bytes, memory maps, and machine code. Things get a little deep at times, but since this is basically a hacker's column (in the good sense of the term), it's appropriate. Most **Shopper** readers seem to agree with what we're doing.

Several people mentioned they would like to see a simple hardware project. So, I am planning on presenting an article or two on an inexpensive Centronics interface that I've mentioned before, starting next month. The interface works well with "EasyScript". We'll be building on what we've learned about the KERNAL, and see how to write the software to drive a parallel printer.

This interface works as good as $50-100 commercial units for most purposes, but it only costs $15-25 or so. If you are handy with a soldering gun and can read a schematic, you can save some money. If not, maybe you will be able to find somebody who can help you with it. It shouldn't be a problem for most user's groups. (P.S.: It's built totally of passive components, so it's fairly reliable, too.)

Some readers would like to see more software reviews, business/application information, and "practical" uses for the 64 presented in the series:

Karen Neuforth of Great Bend, KS wrote about a special interest she has that someone may be able to help her with:

"...I do genealogical research not only for myself but for others as well and am seriously interested in buying commercial software for that purpose...most magazines tend to pander to Apple, IBM, or Radio Shack owners. That leaves us C64 owners out in the cold...for my genealogical interests, I'm stuck. Help!"

Maybe some of our readers can suggest some good genealogical packages for the 64. Some of you might even start a Commodore Genealogical User's Group. Who knows? I know nothing about the subject, so I couldn't help Karen. Hopefully someone can clue us in on what is available.

Karen's letter was typical of several I received. She uses her 64 to manage her accounting books for her farm, does word processing and database management (EasyScript and the Manager), and then uses it to do genealogies as a "pastime". Who said "all Commodore users ever do is play games"? They must not know the Commodore owners I know! Most of our readers, according to our letters, are using their machines regularly in business and personal productivity. Very few said anything at all about games. It is definitely a low priority with 64 owners (even VIC-20 owners, surprisingly).

One person mentioned that they would like to see a compilation of the "Inside the VIC/64" series printed in book form like Randy Holcomb's "Innermost Secrets of the TI-99/4A" series. If there is enough interest, Stan Veit, the **Shopper** editor says it's a possibility. If you are interested, drop us a line and let us know.

I'd like to do more in-depth reviews of software and hardware for the 64, but we need to know your specific interests, so we can plan ahead. The **Shopper** is already providing a monthly review of Commodore software (see "Commodore 64 Reviews" by Cheryl Peterson), and I don't want to just be a repetion. So, I think we'll generally be sticking to the more technical side in this series. But I will, from time to time, make some comments, where appropriate.

Which Reminds Me...

Any comments, criticisms, or recommendations that I make in this column are usually based on my own personal experience with a product, and not a review of a manufacturer-provided sample. For example, the books I recommended last month are either books I own (I've got the receipts to prove it) or have reviewed extensively (usually a friend's copy). This limits what I review, but also makes it easier for me to be objective. If I put out my own hard-earned money for a flaky product, I'm more likely to tell you the truth (and more likely to have a strong opinion) than if I'm reviewing a dealer demo that cost me nothing.

Tax Time

This article will be appearing about the time many of you are planning on doing you '84 tax returns (shame on you for waiting so late...of course I've been guilty too!). You might be tempted to use your 64 to help you prepare your returns.

Timeworks has a software package called "Swiftax" that helps you prepare a 1040 long or short form and several other schedules. The price is reasonable ($35-50 depending on where you buy it) and about what you pay a tax preparer to do the job. Here's a quick review:

"Swiftax" is fairly complete, easy to use, and seems to run without any significant bugs. (I have only seen the '83 version, but the '84 is supposedly very similar.) Overall, it appears to be above the typical quality of Timeworks software (some of which is very poor, in my opinion: read below). "Swiftax" can be a help to you, if you are preparing your own tax returns and it may reduce errors. It is more than adequate for most personal and many small-business tax preparation needs.

Of course, good spreadsheets (like **Calc-Result: Advanced** or **Multiplan**) could easily be used to prepare returns and they can do a lot more than just tax preparation. But, you would have to write the proper templates for spreadsheets to do the job. "Swiftax" is a menu-driven program that works like a "fill in the blanks" test. For the person who has no desire or need to become familiar with an electronic spreadsheet, "Swiftax" is a reasonable alternative.

If you are not a whiz at tax preparation and don't expect to get audited, this package could be an asset in getting your returns together. If there is any chance you might get called in for a "non-routine" audit, go to a tax preparer. It will be much cheaper in the long run.

Also, don't rush down to the store, and buy "Swiftax" on April 14th and then expect to get your returns in on time. This package, like every other I've ever seen, takes some time to learn, so plan ahead accordingly. It can be a help but don't expect miracles, despite the hype. There are other tax preparation programs for the 64, and some of them have been published "for free" in the various Commodore-oriented magazines. I don't know how "Swiftax" compares to them. It does save you from having to find one of them and type it in. It seems reasonably useful and appropriately priced.

Buyer Beware

On the other hand, Timeworks has two other heavily advertised programs that I can't recommend. "Word Writer" (a word processing program) and "Data Manager 2" (a filing program) are well below average in both their quality and usefulness. Each retails for $49.95. For the money, there are much better buys.

I prefer the Precision Software line (Easy/SuperScript and SuperBase). I think SuperBase 64 is one of the best database management programs for the 64, period. I would take it over "Data Manager 2" anytime. Let me add here that my opinion is totally my own, I am very opinionated, and you are welcome to disagree with me. If you and I saw eye-to-eye on everything, then one of us would be unnecessary! I'll leave it at that.

Commodore "Shareware" Where Are You?

To go completely off the subject for a moment, one of the best word processing programs I've ever used on an IBM PC-compatible is called **PC-WRITE.** Why am I talking about IBM-PC software in a

Continued on page 40

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Inside The VIC-20
Continued from page 38

Commodore article? Read on!

PC-WRITE is a "shareware" program (not to be confused with public domain programs). The author **encourages** you to copy the disk and give it away to your friends! Pirates and big software companies can have fun figuring this one out. He asks you to pay for it on an "honorary basis", if you continue to use the program regularly. This gives you a chance to actually use the software in your normal environment (with the author's blessings) **before** you plunk down the bucks. If you decide it's not for you, you're not out anything. Sounds neat to me.

You might say, "Isn't he afraid that he won't sell as many copies, by encouraging people to copy it?" Not really. You see, unfortunately, almost all commercial software is bound to end up in "pirated" form sooner or later. Around many user's groups, there is often a group of "crackers" available to break the latest copy protection scheme.

I've seen thousands of dollars of illegally copied software for the 64, Apple, and IBM. If these "crackers" put as much effort into programming as they do into "cracking", they might be able to write better software than they are stealing and make some legitimate bucks! Instead they spend their time figuring out how to steal software they'll never use more than once or twice. It seems like the only "answer" to software piracy is more copy protection, which, in turn, challenges the "crackers" even more. It is just a vicious, ridiculous, circle.

So, PC-WRITE's author figures there are plenty of honest people out there who would like to have the convenience of a "free copy" without being a "cracker" or "pirate". If he lets people make copies with his permission, for their own evaluation, there will probably be thousands who will appreciate it and pay him for it who would otherwise not. I think it's a smart move.

To become a "legitimate" user of PC-WRITE, you are asked to "register" your program for $75. When you register, you receive a typeset user's manual (much better than photocopies), the Pascal and assembler source code (!), and telephone support from the author. Not bad! Microsoft won't even answer the phone for a WORD user, and it runs $395! For each person you can convince to "register" his or her copy of PC-WRITE, you get a $25 commission back. That's interesting. Sounds like turning pirates into businessmen (or businesswomen) to me! It must be the bargain of the century for PC users. A lot of people probably give the guy the same money for simply acting like a decent human being. I hope this catches on. It might revolutionize the way software is distributed. We need some "shareware" for the 64!

If you or a friend are using a PC, or compatible, and you're interested in PC-WRITE, contact: Bob Wallace, Quicksoft, 219 First N. #224, Seattle, WA 98109. (209) 282-0452. (There are a couple of other PC programs that work the same way: PC-FILE III, and PC-TALK. Both are from different companies.)

A Parting Note:

It looks like the home/small business computer market may have stabilized for a while (maybe a short while). As the smoke clears, the IBM-PC (plus compatibles), the Apple II C/E, and the lowly Commodore 64 stand as the recipients of 90% of all new software development. Although some nice, inexpensive software is coming on the market for Apple and IBM, it looks like the Commodore-128 and 64 will receive the bulk of the low end all to themselves for a while. Many software companies now feel that the only low-end machine they can count on as an expanding market is Commodore (especially after Coleco's recent announcement and doubts about Atari).

One of the best ranked new programs for the 64 is an integrated package from Batteries Included called "HomeWork." **Inforworld** even gave it a good review. (They have been a "trifle" negative on the 64 in my opinion.) I haven't seen it run, but if it is half as good as I've heard it should be great. The price is totally reasonable ($59.95) for a word processor, spreadsheet, filer combination. You might check it out if you need a low cost integrated package to get you going.

Editors Note: As you can see by the cover, Commodore 128 is here! It's C-64 compatibility makes it a natural up-grade path for C-64 owners who, like many of Ted Drude readers, are serious users of application software. Commodore owners rejoice; the company has assured you of the largest library of applications - the CP/M-80 software. What can you do with your C-64 when you buy your 128? Keep it by all means. It is compatible and it was cheap enough to keep as a spare computer.

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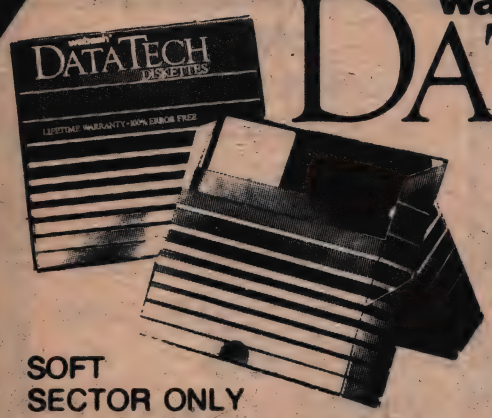

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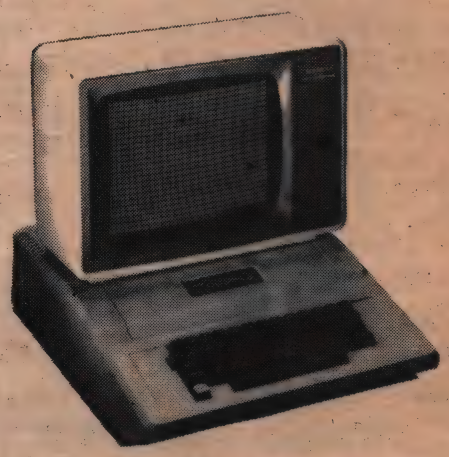

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TURBO/64 & VIC — Sheer Genius On Tape!

by Robert A. Foley

How long has it been since the work of some software virtuoso has left you staring at your video monitor in slack-jawed amazement? Well, if you're a Commodore 64 or VIC 20 fancier, the answer is probably, "Quite a while." After all, the C-64 and VIC are pretty old dogs to be taught any new tricks—right? WRONG! After you see TURBO/64 or TURBO/VIC operate you will gain a whole new perspective in the debate over whether hardware or software drives the computer. Software wins this round, hands down.

One long-standing complaint about Commodore computers has been the incredible slowness of their cassette tape system. This decrepitude has generally been attributed to their roots being back in the dark ages of computerdom, about 1975 (how time flies when you're having fun). The early components were just not capable of handling the baud rates necessary for faster transfers, and by the time better components came on the scene, the system was already set in concrete by that old bugaboo "software compatibility."

All that has been changed by the amazing TurboTape utility detailed in the January '85 issue of COMPUTE! magazine. TURBO gives a C-64 or VIC 20 the ability to SAVE and LOAD programs to cassette tape faster than to a Commodore 1541 disk drive! TURBO is a piece of software that can save any BASIC and most machine language programs without any modifications whatsoever to the program. No hardware modifications of any kind are necessary, either to your computer or to the Datasette. In fact, in its final form, TURBO loads into your computer in less than a minute and occupies only about 640 bytes of RAM.

It isn't often that we promote another magazine, but the TURBO/64 and TURBO/VIC programs in January COMPUTE! are so important to Commodore owners that we must bring them to your attention. How would you like to speed up your datasette operation to disk-like speed? Get TURBO and run it. That is all you have to do to speed up your system.

In the C-64, TURBO may be located at the top of BASIC RAM (40318 to 40959), or at the top of the 4KB RAM buffer (52606 to 53247). The former location is used if you are simultaneously using a ML utility such as Simon's BASIC or PAL, which must reside in the 4KB buffer. If you choose to locate TURBO in the 4KB buffer, the entire 38KB of your normal BASIC program space is left intact. In a VIC, TURBO will automatically locate itself in the top 638 bytes of BASIC RAM, regardless of your VIC's memory size. *However, you must have a minimum of 8KB of memory to type the TurboTape Generator program into a VIC.*

The article in January's COMPUTE! magazine (which you will need in order to type your master TurboTape Generator) mentions the possibility of loading problems arising with TURBOed tapes - problems that might not show up with normally recorded tapes. I suppose this could be so; only time will tell. TURBO makes only one copy of the program per save, not the normal (for Commodore) two, so you won't receive a LOAD ERROR message if you load a faulty TURBOed tape. However, in my own limited experience, TURBO/64 has been 100% trouble free.

The friend who sent me my copy of TURBO/64 also sent along a 12KB BASIC program he had TURBOed, just to see how it would load on my equipment. The program loads perfectly every time. My friend also sent a TURBOed program to another computerist, who reported no problem loading the tape either. As a test, I took a large (33KB) BASIC program and TURBOSAVEd it three times on an old junk tape, retrieved from my "hell box." All three saves load perfectly.

TURBO's commands are simplicity itself: To save a program you type TSAVE"prg. name" and press RETURN. You must use a program name with the TSAVE command, otherwise you will get a SYNTAX ERROR message. TURBO also saves ML programs located anywhere between addresses 0 and 52605. The command format is: TSAVE"ML prg. name", start address, end address + 1. There is even a TVERIFY"prg. name" command that operates similarly to the standard VERIFY, for checking the accuracy of your saves.

You think this all sounds too good to be true—right? WRONG AGAIN! You haven't even heard the best part yet: You only need to use TURBO to save your programs. Once a tape is TURBOSAVEd, you can load it into any C-64 or VIC—at TURBO speed—without TURBO being resident in the host computer! All the standard Commodore load commands such as LOAD, LOAD"prg. name" and SHIFT/RUN are operational as well.

There are only two minor constraints on TURBOed programs. First, programs are no longer interchangeable between VICs and C-64s or VICs of differing memory configurations. This is because a TURBOSAVEd program will always load back into the addresses from which it was saved, as though it were saved with a SAVE"prg. name",1,1 command. Second, the LOAD"prg. name" command will NOT search a TURBOed tape for the correct program, as it will on a normally saved tape. You must position a TURBOed tape at the header of the program you wish to load by using the Datasette's tape counter.

How fast is TURBO? By stopwatch, my 33KB test program took 1:25 to TSAVE. Of that time, 17 secs. is consumed writing a header and 1:08 is the actual time of data transfer. According to my pocket calculator, that comes out to just a shade under 4000 baud, WHEW! The test program will take over a minute and a half to load from a 1541 disk drive, over two minutes from a RABBITed tape and a near-comatose 10:45 to load from a normal Commodore tape save.

How does TURBO work? I suggest you do what I, and a lot of other people are going to do—beg, borrow or buy a copy of the February '85 COMPUTE!, wherein the author promises to enlighten us mere mortals. I haven't the foggiest notion how TURBO manages to increase the cassette save rate by almost five-fold. The one point I do surmise is that the header TURBO writes

Continued on page 44

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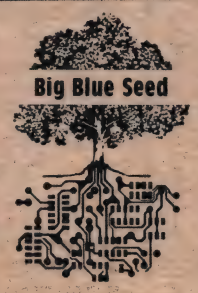

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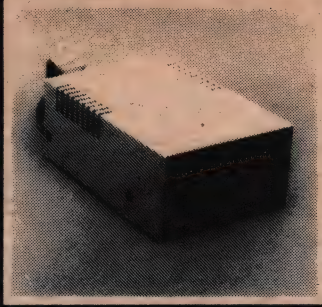

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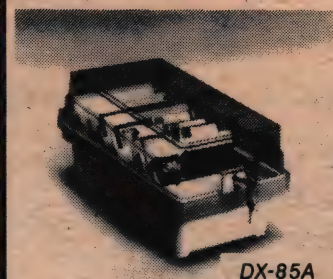

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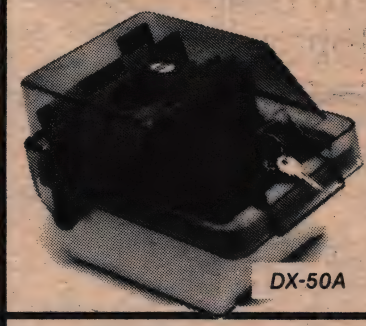

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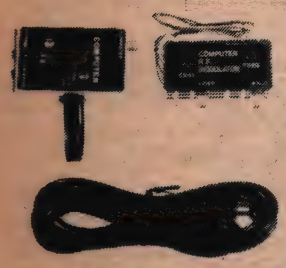

- RF Modulator
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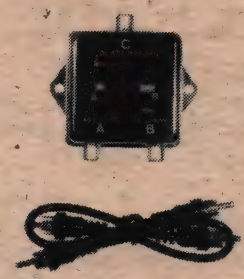

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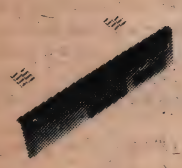

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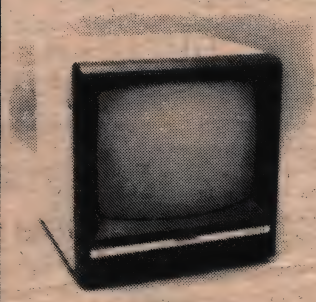

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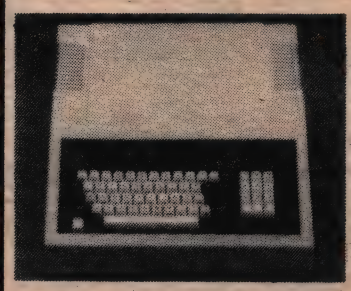

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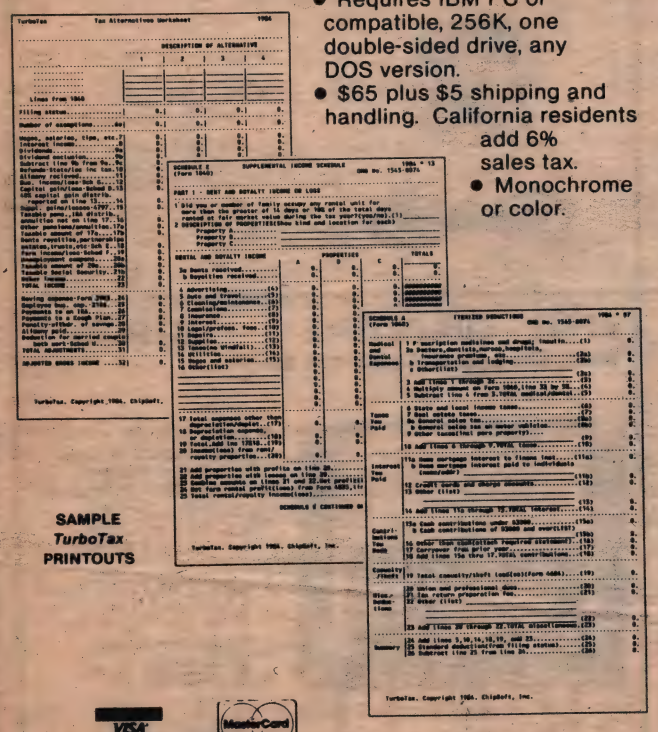

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The Database

by Cheryl Peterson

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Another database program. OK. What's different about this one? "It incorporates a fully implemented 'Help' command function available at any time. Combining the 'Help' command with an on disk tutorial and menu driven screens eliminates the need for a lengthy manual." Or so the package says.

What this really means is that there is NO users manual. NONE! A handy quick reference card has the loading instructions and an alphabetized listing of procedures and how to accomplish them. That's it.

When first loaded, the database offers the chance to look at a set of instructions. These can be printed using a properly interfaced printer and consist of 10 pages of tutorial in three sections. Each of these can be printed individually. It took me seven minutes to print the whole thing on my 160 character/minute printer. A Commodore printer would take fifteen. I guess if it helps keep the price of the software down, it's not a bad idea.

Going through the process of using a database, the instructions explain all the terms needed to use a data management program. The three sections explain creating a file, manipulating data and printing reports and labels. Combined with the on-line help feature and a bit of experimenting, anyone with a basic understanding of databases won't have difficulties using this program.

The on-line help feature is a nice idea but for single drive users it is a small hassle because the help files take up 175 blocks of the disk's 664 blocks of space and must be put on each data disk. Combined with the 202 blocks in the program modules, this leaves only 287 blocks for databases. Since each database is confined to the space of one disk, the help files limit the maximum size of a database.

The program will run without the help files. If they aren't on the data disk, the system gives a polite error message and returns to the most recently accessed prompt. Once the user is familiar with the program, the disk space could probably be recovered.

For those using a two disk drive system, it isn't necessary to put anything except data on the data disk. The database is designed to work with Commodore 1541 drives as device numbers 8 and 9, or with dual drive systems set as device numbers 0 and 1. This allows using MSD, Indus and other third party drives.

The database has all the basic features of a good database manager and a few extras for added convenience. I do wish they were presented in a manual that showed them off to their best advantage. Although the tutorial does explain most of them, some of the really nice features are glossed over with little fanfare and inadequate illumination.

Records can have up to 4000 characters. Field size is limited to 80 characters, but each record can have up to 250 fields.

Data entry is very easy, because the program has full screen editing capabilities. The

Continued on page 48

TURBO 64
Continued from page 42

must contain ML instructions which configure an unTURBOed computer to somehow load a TURBOed program.

According to the documentation in COMPUTE!, you should not use LOAD or the TURBO commands from within a running program. This would seem to preclude TURBOing data files, but don't bet on it. I do know you can TSAVE a program and still keep all the variables intact within the program. Thus, it seems that you should be able to save data files using the TSAVE ML format. Then, if you loaded them back—and added a few well-chosen pokes, to reset some pointers—Hmmm.

Harrie De Ceukelaire, the author of this remarkable program, deserves a vote of thanks from every C-64 owner. He has given us a viable alternative to the mediocre and over-priced 1541 disk drive. As the friend who sent me TURBO/64 wrote, "If it had appeared a few years back, it would have slowed the push to the 1541 disk. TURBO may do that yet; who knows? In any event, TURBO/64 & VIC is a stunning feat of programming ingenuity. It gives one reason to think that a human being will always remain the pre-eminent ingredient in any computer system. ●

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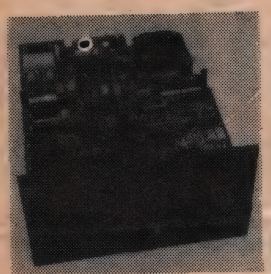

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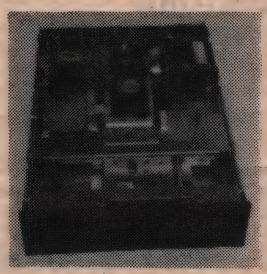

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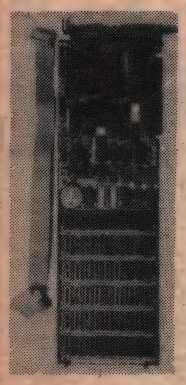

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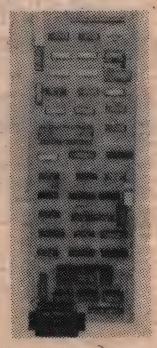

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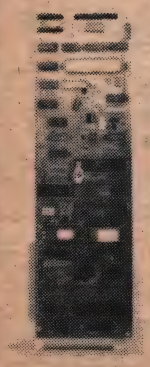

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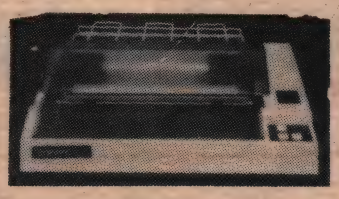

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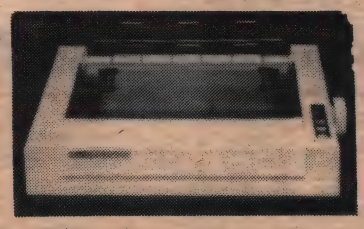

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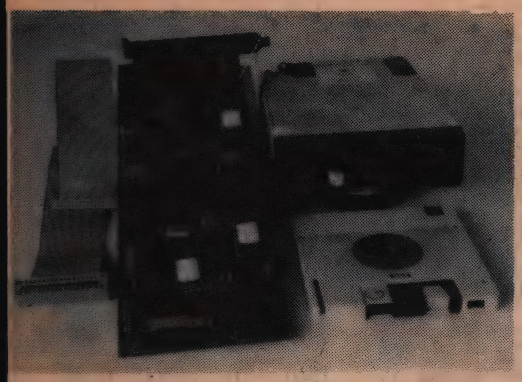

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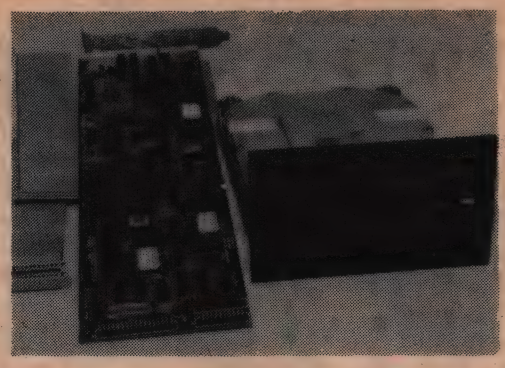

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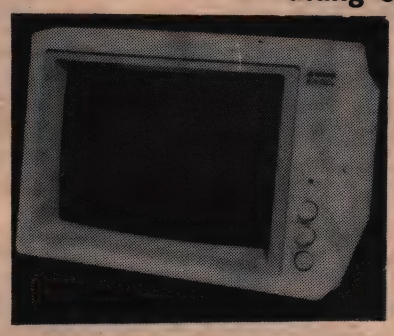

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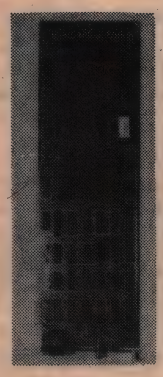

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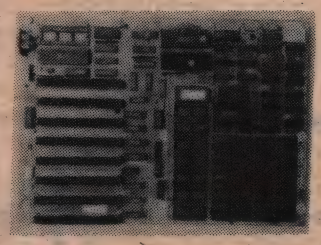

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Doodle!

by Cheryl Peterson

Doodle!
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Available for Commodore 64 on disk. Joystick or trackball controller needed.

Doodle! is one of the many drawing programs available for the C-64. It is well designed, easy to use, and has many useful features. As with any complicated program, Doodle! takes a while to load. Although it is copy protected, I noticed that it didn't slam my drive's head around as some others do. The licensing agreement and documentation specifically say that making backup copies of the disk is prohibited. However, City Software does provide backups at roughly the cost of disks and postage. There is no time limit on Doodle!'s warranty and the company responded immediately when I called with a complaint. Their remedy to the situation was to send me a new copy of the program with an apology. As it turns out, I owe them an apology, since the problem was with my system and not their software.

Ease Of Use

Doodle! is a semi-menu driven program. It starts with a menu of options, but each of these requries further input before they can be used. Choosing an option from the menu calls up a help screen of further commands. Using the RETURN key toggles between the help screen and the drawing pad. The cursor's appearance also changes depending on what mode you are operating in. It takes a bit of getting used to, but the cursor type usually is suggestive of the function you're trying to accomplish.

Each different mode of drawing has subcommands to assist in getting the desired effect. The joystick or trackball is used almost exclusively for positioning the cursor. The different subcommands are entered using the eight function keys or CONTROL or

Continued on page 49

The Database
Continued from page 44

arrow keys are used to move around within the record on the screen. The insert/delete key works in its normal fashion. Commas and other punctuation marks are freely available. In fields designated as numerical, the decimal is automatically placed, though it can be manually entered if you wish. The function 1 key is used to indicate when the record is correct and move to the next one.

Changing records is just as easy. Finding a particular record isn't difficult either. Records can be viewed in forward or reverse order, individually. Searches can be done for any string in any or all fields. Or, if you know the record's key number, you can go straight to it.

Unlike most other database programs for the Commodore, this one will create sequential files that can be read by most word processors. It can also read data from other programs and then write files it can use.

The backup files feature is well designed making it easy to create duplicates of your data. When sorting or selecting records, the output can be sent to the screen, a printer or to disk. If disk output is chosen, the program will ask whether to write the data on the same or a different disk and then request the file name to save the file under. Besides making it easier to create backup copies of files, this makes it easy to transfer data from one file to another. If the file already exists, the selected records are appended to it. If not a new file is created.

There is even a provision to create an empty file, using the record format of an old file. This option doesn't destroy the information in the original, it just copies the empty record format and lets you give the new file a different name. Since the file size is limited to disk capacity, this makes it easy to create a continuation of a perpetual database. For instance, by using this feature's ability to create the file on a new disk, inventories could be kept on a yearly basis—one year per disk—without the record format having to be recreated for each one.

The printout functions are much better than I expected. Printing labels is very easy to do. When printing reports, the designing of the form can be a bit complicated, but this is because the program is so flexible. If your printer can handle it, reports can be up to 160 columns wide. All or only selected fields can be printed. You decide how much space is given to each field. Totals and grand totals can be printed, as well as the number of records printed.

Before printing, records can be selected and sorted into just about any order, alphabetical, numerical (highest to lowest or vice versa). The selection criteria can include the values <, >, =, ≠. These can also be and/or, so you can choose values that are > and =, > and ≠, < or =, <x or >y, etc. These values can be chosen for any one field or in several fields. VERY FLEXIBLE.

The search and select features are great, but from reading the tutorial you wouldn't know how to find a group of records by specifying the highest and lowest values acceptable in a particular field. For instance, if you had a database of all the checks you'd written in the last year, it would be possible to search the date field and find only checks from June. But the tutorial gives no idea that it can be done. If you're the experimentative type, you'll find marvelous ways to use these features.

Setting up complicated sorts can be a pain, if several copies of a report are needed. But using the output to disk option can save having to re-sort the data each time it is printed.

The report format can be saved to disk for repeated use. Since the program asks if you would like to use an already created report format and then requests the name, a report format can be used with more than one database.

The error trapping is very good. Most of the messages are in plain English. It never locked up on me, as some others have been known to do. There are reminders in appropriate places to keep you from making fatal errors. "Be sure printer is on." "This procedure will destroy all information on disk. Type YES to proceed."

Once used to how the program worked, I enjoyed using it. It is well designed and I didn't have any problems with it. With the inclusion of the online help it's easy to use. The price tag is even reasonable. If you need a good database manager, this one will do the job. ●

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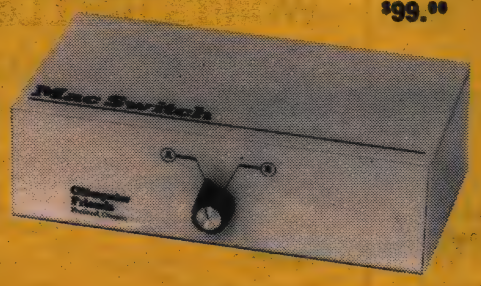

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Doodle!
Continued from page 48

COMMODORE key combinations.

One particular option that adds greatly to the programs ease of use is the speed adjustment. People's reflexes differ and Doodle! allows you nine separate dwells for the cursor. How fast the screen's cursor follows the controller's movement is an important consideration when fine or detailed work is being done. The smaller the lines being made, the slower the cursor needs to move. This can be changed anytime while working merely by pressing a number key. Very convenient.

Another convenience is the on/off switch of the fire button. Instead of pressing the fire button constantly while drawing, you need only press it momentarily to go from draw mode to move the cursor mode. This saves a lot of energy.

Features

Doodle! has many of the same features as MicroIllustrator or similarly priced graphics packages; sketch, circle, box, fill, zoom, and line. These features, though similar to ones in other drawing programs, are also unique in their execution. Frequently, this gives the artist a bit more flexibility in his drawing.

Take for instance, drawing circles. In other programs, circles are created by marking the center point of the circle and then moving the cursor outwards until the correct radius is shown. Pressing some trigger device then draws in the circle. Doodle! starts with a centerpoint, but it uses a box to define the horizontal and vertical dimensions of the circle. When it is first called up, the box is square, approximately an inch in diameter. Using the joystick or trackball, the figure can be placed anywhere on the screen. Pressing the fire button, changes to define size and shape mode. Here, moving the controller vertically changes the height of the circle, while moving horizontally changes the width. This makes creating ovals as easy as creating circles.

Most of the drawing commands work in a similar fashion. Boxes don't have to be square. Sections to be moved or copied don't have to be square. Box mode also has an interesting feature called op-art, which creates a very '60's-ish looking outline effect.

A group of subcommands that are available in both draw mode and box mode help do useful things. A G command overlays a grid so that positioning elements of a drawing is easier. There are commands to switch to mirror and negative imaging modes, to memorize a screen or section of screen, and to recall what's been memorized. Memorize is a handy feature to use while experimenting. If something should go wrong, doing a recall will get you back to where you were the last time you "memorized." Of course, it isn't a bad idea to save your picture to disk occasionally.

Fill is probably the most universally available command for drawing programs (right after draw, of course.) Any enclosed area can be filled with whatever color you choose. Unlike MicroIllustrator and similar programs which also have a checkerboard pattern in two colors fill, only a solid fill can be chosen using Doodle!

Zoom mode makes it easier to get at the details by enlarging a portion of the screen. In this mode, small blocks can be "colored" or "uncolored." Scrolling is available, so you aren't limited to just one section at a time.

I've only seen one "Zoom" mode that I like better. The KoalaPaint program uses a split screen to show how the drawing looks in normal mode and zoom, so you can see what you're doing better.

A mirror mode lets you flip your creations over, right to left. This could be handy for changing the direction in which your figures face. A similar command, the rotate feature is also great. It allows you to box a part of your drawing and then rotate it 90 degrees. Using this feature, you can create upside down or

Continued on page 50

Two For Tots
Continued from page 25

UP ARROW indicates that it is. If the shapes match, Ernie nods his head, zaps the shape up next to his first shape and his magic rabbit comes out and does a little dance. If not, Ernie shakes his head and waits for the DOWN ARROW to be pressed, indicating he should make that shape go away. Pressing the DOWN ARROW key makes the shape disappear, whether or not it is correct. If it is correct, the shape will reappear later, so little is lost except time.

This game has seven difficulty levels. The first level only displays one figure at a time. The second level displays one figure at a time, but though the shape may be correct, the color may not. The rest of the levels get more complex, adding more shapes to the figures. Some also require color matches.

Conclusions

The graphics are quite accurate. My test subjects had little trouble identifying who the characters were, what the pictures represented or what the shapes looked like. The sound is designed to be encouraging or discouraging where appropriate. The documentation has plenty of cute illustrations and is clear and straightforward. An instructions card can be set by the computer to make loading and use easy.

These games are planned so that children are not penalized for wrong answers and there is no scoring done. The immediate rewards of sight and sound are all that are used to reinforce the learning. No judgment is made, no real criticism given; just the chance to try again. To me, these are strong points. To other parents, maybe not.

I feel these packages are certainly worth the $25 price. Many software houses use a cartridge as an excuse to jack the price up $5. I'm pleased to see that CBS isn't one of them. Be wary when purchasing these packages at Sears; some are selling them at $35. ●

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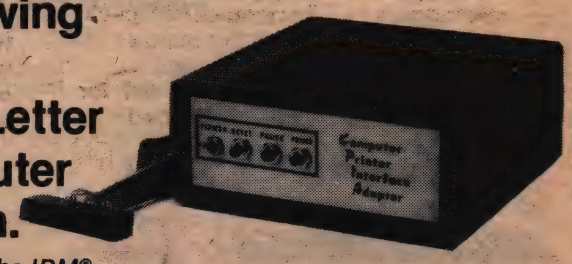

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Doodle!

Continued from page 49

reverse copies of anything on the screen.

A negative image mode turns all the light places dark and dark places light, much like a photographic negative.

Two stand-out features are the "stamp" mode and "letter" mode. With "stamp" mode, you define a square and memorize its contents. Using the controller you move a square the same size into position anywhere on the screen. Anytime you press the fire button, the "stamp" is copied into the area defined by the square.

"Letter" mode lets you label elements of your picture or use the Commodore's graphic symbols within your drawings. Letters can be the normal size print created by the C-64 or any size up to the full screen. The larger the letter, the lower the resolution, however. Letters can be printed in reverse video, upside down, top to bottom or bottom to top, left to right or normal. Letters already printed can be "whited out," as well. This is one of the nicer features; one lacking in many other programs.

Color is also an important factor in drawing, and here too, Doodle! has a couple of very useful commands. Changing the brush or background color is a simple enough function, but Doodle! carries the idea one step further. One of its subcommands allows you to change all of the background to the new color. Another allows you to change all of the foreground (lines you've drawn) to the new color. Or, by moving a small square around your drawing, both the background and foreground can be changed in small sections. In this mode, using the fire button changes the small square from green to red and back. When the box is red, it changes the colors wherever it moves. Green lets you move it around without effecting your drawing.

Documentation

The documentation is well designed giving clear and concise instructions. Liberally sprinkled with sample drawings, the manual takes a tutorial approach and steps through the miriad commands individually.

This is one program that could really benefit from the inclusion of a well designed commands summary card. Though the menus are never more than a RETURN key away, looking at the drawing while you decide what to do next usually sparks creativity more effectively than a menu full of commands. And when creativity strikes, fumbling through the subcommand menu to get to the main menu is a pain. If you know the commands, they can be accessed from the drawing screen by pressing the appropriate function key. If you can remember them, that is.

Like other good programs of this type, Doodle!'s documentation contains a short BASIC routine that will let you load in Doodle! graphic files from outside the program. Without this, your drawings would be fairly useless, except for printing and hanging on a wall.

Printing

Doodle! also has a built-in printer dump program that works with many popular printers and interfaces. And the most recent version claims it will create color illustrations using the Okimate 10 color printer.

Limitations

Doodle! has one limitation that I found tough to live with after using other drawing programs. The brush size can be varied, but not the stroke. The tip can be from one to nine pixels wide, but the width is always horizontal. Micro-Illustrator and KoalaPaint both give alternative dot placement as their brush qualities; two or three dots in a diagonal row with spaces between them, a solid diagonal, vertical, or horizontal line, diamond or unfilled box patterns. These help give different textures to drawings.

Another limitation that I can live with, but don't particularly enjoy is that you can only be working with one picture at a time. KoalaPaint has a lovely option that aids the artist in moving chosen sections of one picture to another. Using the memorize feature of Doodle! and then loading in a saved background and stamping or copying the memorized piece onto the new background would do it, but it wouldn't be really convenient.

Conclusion

Despite the slight criticisms given, I feel this is a well designed and functional program. It is both easy to use and well documented. It makes good use of the Commodore's flexibility. Its commands execute instantly; no waiting, no fuss. It has features not found in other similar programs and I feel that it is competitively priced. All in all, a fine program. ●

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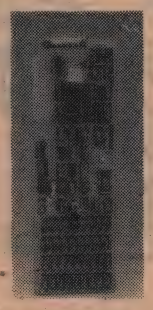

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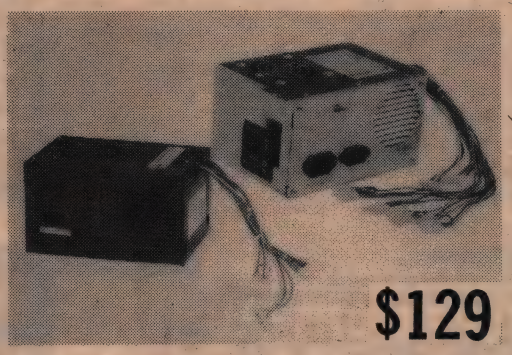

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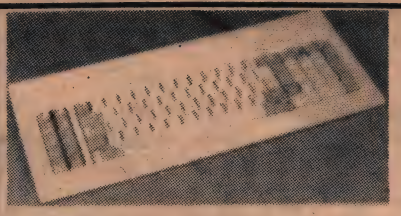

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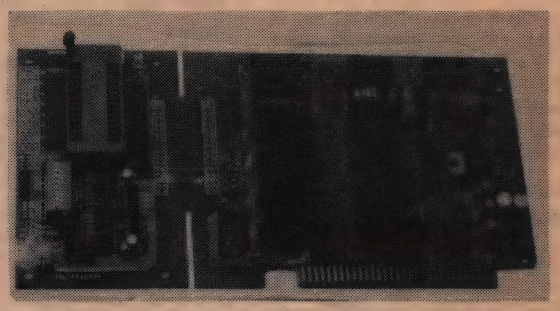

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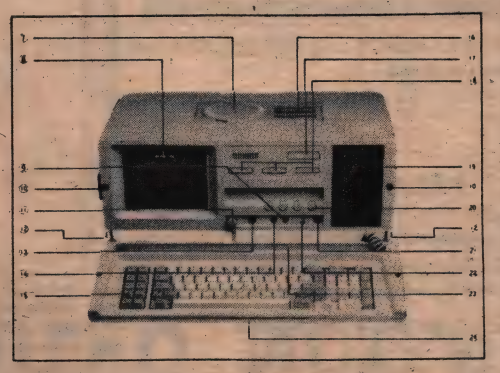

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One thing I'll say for this game—it's certainly got a lot of bounce. Pogo Joe is a Q-Bert clone that didn't stop at the pyramid. The character you control is a youngster on a pogo stick, jumping around on cylinder tops. Each cylinder changes color as you land on it—20 points per cylinder. In some cases, each top need only be jumped on once; in others, multiple jumps may be necessary to reach the proper color. Another way to get points is to catch the toy monsters that are jumping around with you; 250 points each. When all the cylinders are changed to the new color, the monsters all disappear and a new screen starts.

The object is to get as many points as possible, of course. (If you're the curious type, you may want to try to see how many screens you can get through. In this case, you don't go for points as much as try to finish the screens.)

As in Q-Bert, movement is diagonal instead of top to bottom or side to side. By pressing the fire button on the joystick, Pogo Joe can jump two spaces at a time. This is particularly useful for avoiding baddies.

Since not all of the denizens of the cylinders are benevolent, catching some of the monsters can be fatal to your Joe. How do you manage it then? The monsters first appear as eggs; after about three jumps they turn into monsters. During the egg phase, all are harmless. Once they change though, some become deadly. Others just start turning the cylinder tops back to their original color.

There are several green flashing cylinder tops in each screen. By jumping on these, all toy monsters on the screen are caught, giving you the appropriate points without you being blown up by the baddies. Since each flasher can only be used once, it's a good idea to plan when to hit them for best effect. Once they're gone you're on your own, until the next screen appears.

You get five Joes to start with. Each 5000 points brings you another Joe. It is possible to work your way up to 10 or more, if you don't get blown up too many times.

This game has great graphics, fantastic sound and fast response (sometimes faster than you are). The song that plays continually is better than many game themes I've heard. The explosion sounds made when eggs appear, turn into monsters or blow you up, are clear and crisp. The Pogo jump sound is adequate and the reward of 5000 points that signals you got another Joe is great. There is a separate little dittie that plays when you finish a screen or get blown up.

The game has a screen tour, so you can get a good idea of what you're up against. There are blank mystery screens in which you have to figure out where the cylinders are. Each screen has its own name, which appears briefly at the top of the monitor when the screen first appears. So if you're paying attention and can remember them, the mystery screens aren't totally disabling. They change every game by the way, so don't expect the same ones each time.

In another screen variation, each place you jump disappears when you leave it. At the end of this one, there is a 5000 point bonus for getting rid of all the spots; 4000 points for 1 spot left, 3000 for 2 spots, 2000 for 3 spots and 1000 for 4 spots. No bonus for more.

The variations on the main theme and the large numbers of screens available—the screen tour goes up to 64—makes this an excellent game. There is a pause feature, so you can take a break and think about what you're doing occasionally. You can start the game at different screens, so when you're bored with the beginning ones, you can try some others farther along.

This is one of the games that I really enjoy. I seem to keep coming back to play it again and again. With little difficulty, I could spend days playing it. Once you've gotten good at it (to the tune of over 100,000 points) you can easily drag a game out past an hour. Beware though, this little gem is addicting and you may have to fight off the rest of the family for the chance to play. ●

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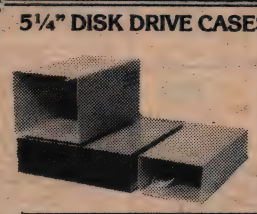

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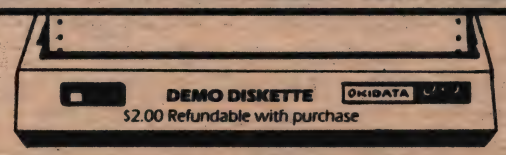

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ATARI

This Is The Computer That Jack Built!
The New Atari Corp. Introduces New Line at CES

By Computer Shopper Staff

When the Consumer Electronics Show in Las Vegas opened its doors on January 5th, all eyes were on the large Atari exhibit, roped off and guarded by uniformed people with large guns on their hips! In addition, all the machines were covered with drapes to shield them from curious eyes! We all wondered what could be going on here. After trying to enter by flashing a press badge and being repelled, we found out that the Governor of the State of Nevada and Jack Tremiel himself would formally open the booth at 9:45 a.m. Until then, everything was under wraps.

Soon a crowd gathered, lured by the sight of television, radio and local newspaper people setting up their equipment. By 10 a.m., the great ones arrived for the ceremony. There was the Governor of the state ready to proceed with the unveiling of the computers and Jack Tramiel, the creator, smiling on all who attended. The only thing lacking was a bishop to bless the event as they do for fishing fleets and packs of hunting hounds. You have to hand it to Jack. He upstaged all the other exhibitors at the show on the opening day. We could not help contrasting the vibrations of success in the Atari booth with the deep gloom prevailing in the next one. Here were the sad people representing Coleco and the Adam. Their booth was full of the wonderful things you could do with the Adam and all the new software and peripherals recently introduced for this "reborn" computer. The trouble was that while setting up, Coleco announced the death of the Adam and the sales of the inventory to one unnamed discounter. The poor Adam people were trying to smile with the tradition of "the show must go on."

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Continued on page 56

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Computer Jack Built
Continued from page 53

screen does not seem to make much sense.

The star of the 65XE line, we feel, will be the Atari 130XE with 131,072 cbytes of RAM memory. With this extra memory available for animation and extended graphics, users will be able to do really interesting things with the 8-bit line.

And Now For Something New From Atari

The 65XE 8-bit line are merely new versions of the 800XL computers, but Jack Tremiel promised new things from Atari and here they are—the Atari 130ST and 520ST, two new 16-bit M68000 based computers with all the bells and whistles of the higher priced 16-biters. The secret is in the software, and Atari has incorporated Digital Research's GEM graphics environment into their TOS operating system. This includes such features as Icons, Drop-down menus, Windows, Vector drawing, GEM virtual device interface and application services. The graphics and screen applications are controlled by a two-button Mouse.

There are three graphics' modes: Low resolution (320 x 200 pixels), Medium resolution (640 x 200 pixels), and High Resolution (640 x 400 pixels). In the medium and high resolution modes, there are 512 colors available—eight levels each of red, green and blue.

The music capability of the ST series has three voices, and a range from 30Hz to above audible range. There are separate frequency and volume controls provided. The MIDI interface controls external music synthesizers.

The ST series has both a Centronics printer port and RS232C Serial for a modem or serial printer. Controllers for both a floppy disk interface and a hard disk are built in. There are two joystick ports and one is configured for the two button mouse.

The floppy disk system uses 3½" disks with capacities of either 250K or 500K capacity. There is also a 3½" hard disk of 10 Mbyte capacity available. In spite of all the disk-based input, cartridge input is still available for the ST computers.

The keyboard is an ergonomic design with a good feel and an 18-key keypad. There is a cursor control cluster for easy use. The video line-up includes the ability to use a T.V., low-resolution composite video, medium-resolution RGB monitor and a high-resolution monochrome monitor.

ATARI 130ST PERSONAL COMPUTER

The 130ST comes with 131,072 bytes of RAM and

Continued on page 60

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We have 8Kx8 static RAMs: HITACHI HM6264-P-15, HM6264LP-15, and the TOSHIBA TC5565PL-15. These are 28 pin devices compatible with 2764 EPROMs. Both the Hitachi and Toshiba parts are pin compatible. After a brief discussion by phone with both company offices, we are under the strong impression the Toshiba part is slightly better. Both brands have two chip selects, and go into low power mode when only either chip select is disabled. Both Hitachi devices, the P-15 and LP-15, are the very same part, made the same way at the same time, however, the LP device is culled out or tested as being a lower power device. The Toshiba PL-15 and Hitachi LP-15 appear to have identical specs.

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Words For Your Atari— S.A.M., The Software Review

by Russell Kavanagh

Meet S.A.M. (Software Automatic Mouth), a voice synthesis system that requires no additional hardware for a disk-based Atari. All voice synthesis is done in software, with output through voice zero. S.A.M. is available from Don't Ask Computer Software. Using S.A.M. and a few BASIC statements, or from an assembly language program, you can generate very respectable speech through your TV or monitor speaker.

The S.A.M. disk contains several programs. In addition to the actual speech synthesis program, which requires the use of phonetics, a program is provided that converts English text to speech. This allows you to enter whole words or phrases and hear them pronounced immediately. Also on the disk are several speech demonstration programs, with preprogrammed texts and a number guessing game.

Upon booting S.A.M., I was able to produce speech in only minutes, using the demonstration programs. A well-written 40 page manual (5.5"x7.5") provides information on the phonetic spelling system used by S.A.M., how to use S.A.M. from BASIC and with machine language, how to add stress to the speech, the effects of punctuation, and the use of pitch and speech speed controls. Also included is a listing of nearly 1500500 phonetic conversions of S.A.M.

My first listening impression of S.A.M. was that it was very "electronic-sounding", more so than hardware-based synthesizers. I noticed a buzz in some words, and some general background hissing and noise between phonemes. It also sounded like the poor guy (yes ladies, I think S.A.M. is a boy) had a terrible cold. But the speech was surprisingly good, in fact, bordering on exceptional, especially considering the low cost of the software and the general-purpose hardware with which it was working. And, as might be expected, the more I listened, the easier S.A.M. became to understand. I own a voice synthesizer based on the Votrax voice synthesizer chip, so I compared the two. I found that S.A.M.'s claim to sound equal to or better than hardware synthesizers to be reasonable, although the comparison is very subjective. Although I thought the tone of the hardware synthesizer was more pleasing, clarity was equal. In fact, I felt the English-to-text routine in S.A.M. was a little better at pronouncing words than the hardware unit.

So what are the disadvantages of S.A.M.? I see two. First, since S.A.M. is software based, it takes up room. The S.A.M. program itself uses nearly 9K, and the English-to-text routine requires an additional 6K. A second disadvantage, and one I consider the most serious shortcoming, is that S.A.M. blanks the screen while talking. Otherwise, gaps would be inserted into the speech every time direct memory access is performed during screen updating. Although S.A.M. can be forced to leave the screen display on while speaking, the result is badly distorted speech. Surprisingly, the speech is still fairly intelligble.

If you are looking for a low-cost voice synthesizer, then consider S.A.M. The phonetic spelling system is easy to master, since you don't need to

Continued on page 60

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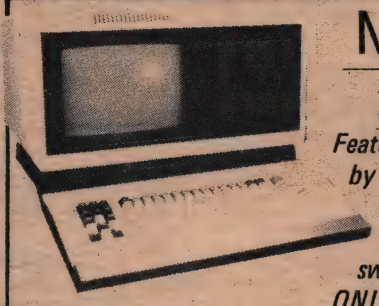

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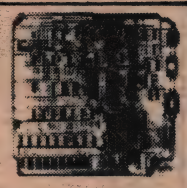

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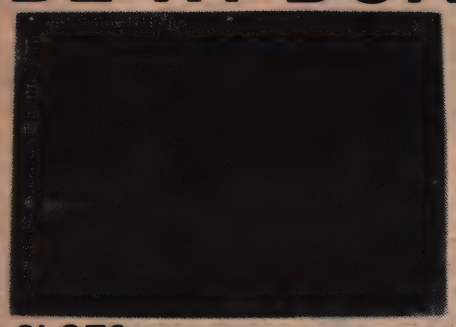

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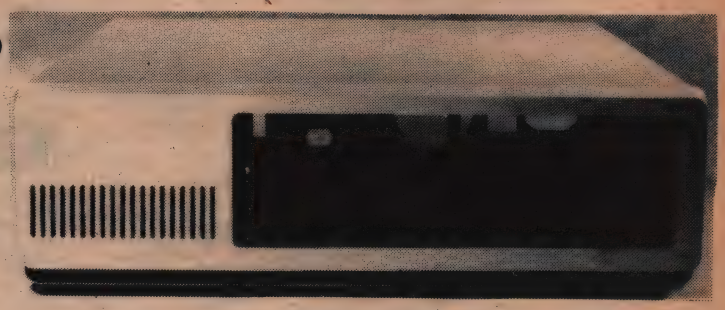

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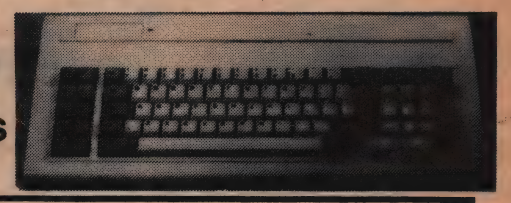

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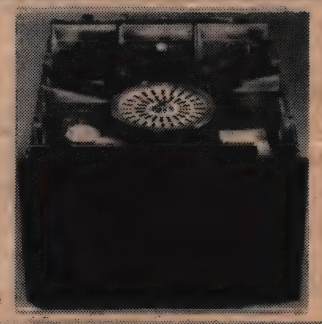

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Applying the Atari

by Jeff Brenner

This month's feature program is an on-screen alarm clock, ideal for those of you who have difficulty pulling away from your Atari to sleep, eat, work, etc. We'll also enter a joystick-tester program and a printer utility, and we'll look at two children's programs from Mindscape.

Adios Adam

At this writing, Coleco Industries Inc. officially dropped its Adam computer. It had been a tough, long year and a half for the Adam from the day of its planned introduction in June of 1983. If not for their Cabbage Patch Kids, Coleco's story might have been a much, much sadder one. So you see, folks, Atari has lived to witness the fall of yet another competing computer product.

Atari News

A few days after Coleco's announcement, Atari displayed several of its new computers at the Las Vegas Winter Consumer Electronics Show. The new machines make up the "XE" line. One is a 64K, XL-compatible portable. The others are Atari's first 16-bit units. We'll have more details on these models next month.

Reader Mail

I got this idea for a joystick testing program after an incident I had with a new game program. For days I tried to figure out why the game wasn't working like it was supposed to. Just when I was ready to bring the game back to the store, I found out that my joystick was not registering the up, or diagonally-up directions! Just run the program and move the joystick to each of the positions shown in the picture on the screen. If the joystick is O.K. the program will say so. Otherwise, it will not let you go on past the non-working direction. It also checks the joystick trigger. I hope your readers find it handy.

Ricky Freeman
Baton Rouge, Louisiana

I'm sure they will. The program is listed under the "JOYSTICK TESTER" heading and has been slightly modified to facilitate its printing in the magazine. Thanks for writing.

I'm a novice Atari user and recently bought an Epson RX-80 printer. I'm very interested in using the printer to create graphics. A salesman told me I need a "screen dump," but since I am not familiar with this I am asking for your help.

B.E. Grant
Newark, New Jersey

Very simply, a screen dump

Continued on page 61

```
JOYSTICK TESTER


INE 10 REM JOYSTICK TESTER
PNE 15 POKE 82,15:PRINT CHR$(125)
MJJ 20 READ A:IF A=-1 THEN PRINT :GOTO 20
NEE 30 IF A>-2 THEN PRINT CHR$(A);:GOTO 20
SNE 35 POKE 82,2:PRINT
MOJ 40 FOR I=1 TO 8:READ VALUE
CKJ 50 PRINT "MOVE JOYSTICK TO POSITION #";I
HPJ 60 IF STICK(0)<>VALUE THEN GOTO 60
OEJ 70 SOUND 0,10,12,8:FOR J=1 TO 50:NEXT J
KTJ 80 SOUND 0,0,0,0:PRINT "GOOD":NEXT I
FMJ 90 PRINT :PRINT "PRESS TRIGGER"
VAE 100 IF STRIG(0)=1 THEN GOTO 100
MTE 105 PRINT "GOOD"
YUJ 110 PRINT :PRINT "JOYSTICK IS WORKING!"
POJ 120 END
MKJ 130 DATA 49,32,32,50,32,32,51,-1
EWJ 140 DATA 32,7,32,124,32,6,-1
YIJ 150 DATA 32,32,7,124,6,-1
MWJ 160 DATA 52,18,18,20,18,18,53,-1
YKJ 170 DATA 32,32,6,124,7,-1
FAJ 180 DATA 32,6,32,124,32,7,-1
MXJ 190 DATA 54,32,32,55,32,32,56,-2
FLZ 200 DATA 10,14,6,11,7,9,13,5
```

S.A.M.

Continued from page 58

be able to spell to program a word - you only need to be able to say it! The English-to-text program does a very respectable job in producing speech, but it does make mistakes. The most intelligible speech is produced using direct phonetic input, which allows placing inflection in speech and permits fine control of word pronunciation. Using phonetics is a bit tedious, and in itself uses more memory, since a word spelled phonetically almost always takes more characters than the straight English spelling. All of the demonstration programs and the English-to-text program can be copied onto your own DOS 2.0S disk. You cannot make a back-up copy of the actual speech synthesis program. A replacement copy can be obtained for $5.00, though. If you aspire to sell programs utilizing S.A.M., a licensing agreement can be obtained from Don't Ask Software. The manual is well written, and will enable you to begin talking through your Atari in short order. If, however, your application requires a simultaneous screen display and voice, then S.A.M. won't be able to do a very good job. But for easy to obtain and good sounding voice synthesis, S.A.M. is an excellent choice. The Software Automatic Mouth is available through

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Computer Jack Built

Continued from page 56

196K of ROM expandable to 320K with plug-in cartridges. The 520ST increases the RAM to 520K bytes. Language available at this time include BASIC and Logo.

Conclusions

You may read this and ask the most natural question 'How much will all this cost?" As with the Commodore 128, we do not know. Prices were not announced, but rumors flew everywhere. The 65XE series was rumored to be in the "$200 price range," the 130ST "around $600," the hard disk $500. None of these speculations drew more than a smile from the Atari crew. The motto of the New Atari Company is "Power Without The Price." They have lived up to half of their motto. They have shown the power, but they have not given us the price!

The level of press cooperation has not changed at all at Atari. Their press kit was hardly complete, lacking even a phone number and a contact person within the company. Mr. James L. Copeland, VP Marketing, was listed as the contact person. We tried to contact Mr. Copeland after the show but no telephone number was given for him. We tried the general number and all we got was a recording telling us the lines were busy. Oh yes, they will publish their own magazine called Atari Explorer, which will get all the information first and will be their user contact.

Applying The Atari
Continued from 60

is a routine which prints, or "dumps," the contents of the screen to the printer. The best way to draw graphics on your printer is to first create the image on the screen and then transfer the contents of the screen to the printer. Many graphics programs on the market contain a built-in screen dump that allows you to print displays created with the program. A screen dump to print displays created by your own BASIC programs is not difficult to design, and one is listed under the "GRAPHICS DUMP UTILITY" heading.

This program will print graphics created in GRAPHICS 6, 7, 8, 9, 10, 11, 14 and 15. GRAPHICS 8 works best. As is, it will work with most Epson, Gemini, or graphics-compatible printers. To use, simply GOTO 31000 after creating a display on a graphics screen. If your printer is properly connected and its power on, the graphics will be printed. The program will automatically compensate for graphics modes with or without a text window.

Higher horizontal resolution on the printer is possible by changing the MODE variable on line 31020. When MODE = 1, the resolution is 60 dots-per-inch. When MODE = 2, the resolution is 120 dots-per-inch. On the Epson FX-80 and RX-80, and on the Gemini 10X and 15X, two additional modes (MODE = 3 and MODE = 4) may be used by adding the appropriate characters to the data in line 31080 of the subroutine. When MODE = 3, the double-speed, 120 dots-per-inch mode is activated. Quadruple density is available when MODE = 4. This gives a resolution of 240 dots-per-inch.

If you have an Epson, add ,Y,Z to the data statement in line 31080 so it reads:

31080 DATA K,L,Y,Z

If you have a Gemini, the two additional letters must be lower-case. Line 31080 will read:

31080 DATA K,L,y,z

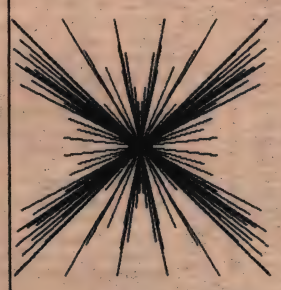
Demo 1 and Demo 2 are sample BASIC graphics listed under their respective printer outputs. Enter Demo 1 without erasing lines 31000-31220 of the Graphics Dump Utility and run it. Your printer should display the same output. For the second demonstration, type NEW, load the Graphics Dump Utility into memory again, add Demo 2 and run it.

The Graphics Dump Utility differs from other screen dumps in that it prints horizontally on the paper, as it appears on the screen. Normally, a graphics dump would print the image on its side. To correct this, our utility reads the screen sideways to yield an upright image printout.

```
GRAPHICS 'DUMP UTILITY

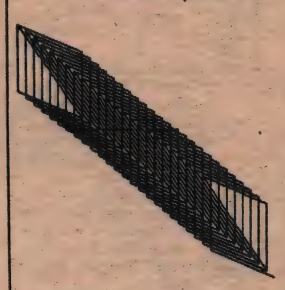
EXJ 31000 REM GRAPHICS DUMP UTILITY
KNJ 31010 REM BY JEFF BRENNER
VNJ 31020 MODE=2:DIM A$(150),B$(320),S$(1):OPEN #1,8,0,"P:":RESTORE 31040
DIJ 31030 FOR I=1 TO PEEK(87)-4:READ BPL,VERT:NEXT I
ULJ 31040 IF BPL=0 THEN PRINT "UNSUPPORTED MODE":END
SJJ 31050 DATA 0,0,20,80,40,80,40,160,40,160,40,160,40,160,0,0,0,0,20,160,40,160
DIJ 31060 IF PEEK(703)<>4 THEN VERT=VERT+VERT/5
UEJ 31070 RESTORE 31080:FOR I=1 TO MODE:READ S$:NEXT I
FIJ 31080 DATA K,L
RQJ 31090 RESTORE 31160:FOR I=0 TO 91:READ A:POKE 1536+I,A:NEXT I
BQJ 31100 S=PEEK(88)+256*PEEK(89):PRINT #1;CHR$(27);CHR$(64);:BPL=BPL*8
LYJ 31110 PRINT #1;CHR$(27);CHR$(65);CHR$(8);:HI=INT(BPL/256):LO=BPL-HI*256
SRJ 31120 FOR I=1 TO INT(VERT/8+0.5):POKE 207,INT(S/256)
RLJ 31130 POKE 206,S-PEEK(207)*256:B$(1)=CHR$(0):B$(320)=CHR$(0):B$(2)=B$
VFJ 31140 A=USR(1536,ADR(B$)):PRINT #1;CHR$(27);S$;CHR$(LO);CHR$(HI);
CPJ 31150 PRINT #1;B$(1,BPL):S=S+BPL:NEXT I:END
TLJ 31160 DATA 104,104,133,205,104,133,204,160,0,162,8,177,206,157
MYJ 31170 DATA 92,6,24,165,206,105,40,133,206,165,207,105,0,133
YNJ 31180 DATA 207,202,208,235,198,207,56,165,206,233,64,133,206,165
ONJ 31190 DATA 207,233,0,133,207,169,8,133,203,162,8,177,204,62
RIJ 31200 DATA 92,6,42,145,204,202,208,245,198,203,165,203,240,16
PJJ 31210 DATA 24,165,204,105,1,133,204,165,205,105,0,133,205,76
IJI 31220 DATA 51,6,200,192,40,208,174,96
```

Demo 1



```
10 REM DEMO 1
20 GRAPHICS 24:COLOR 1:X=0:Y=191:I=X
30 TRAP 70
40 PLOT X,Y:DRAWTO 319-X,191-Y
50 PLOT X,191-Y:DRAWTO 319-X,Y
60 X=X+Y:Y=Y+X
70 IF X>319 THEN X=X-319:GOTO 70
80 IF Y>191 THEN Y=Y-191:GOTO 80
90 I=I+1:IF I<30 THEN GOTO 30
100 GOTO 31000
```

Demo 2



```
10 REM DEMO 2
20 GRAPHICS 24:COLOR 1:TRAP 90
30 FOR X=0 TO 300 STEP 10
40 Y=INT(X/2+0.5)
50 PLOT X,Y:DRAWTO X,Y+50
60 DRAWTO X+80,Y+70:DRAWTO X,Y
70 DRAWTO X+80,Y+20:DRAWTO X+80,Y+70
80 NEXT X
90 GOTO 31000
```

Reminder

Next month's column will contain our first "Programming Tips" section. Programming hints and ideas sent in by readers will be included here. If you have any programming suggestions, or short, handy programs from which others may benefit, send them in. Contributors whose ideas are printed will receive three-dimensional, laser-etched hologram stickers. Let me hear from you.

Imperfect Program Perfect

January's column contained some modifications to Program Perfect which originally appeared here in December. If you followed the article carefully, you should have had no problems in making the changes. However, I would understand if there was some confusion, as two lines of the program got squashed together in the typesetting department. Line 30260 should read as follows:

30260 IF T>650 THEN T = T-650

Program Perfect is used to prevent typing errors in programs entered from this column. It makes use of a three-letter code which precedes each line of the longer programs which appear here. If you're new to Computer Shopper (and I understand we're still gaining new readers at an amazing rate), you will find a complete listing of Program

Continued on page 64

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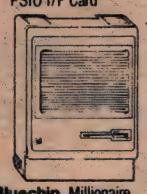

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Applying The Atari
Continued from page 61

Perfect in next month's column. If you can't wait, you can send me a self-addressed, stamped envelope for a listing, or send a cassette or formatted disk and $2.00 for handling and return postage and I will make a copy for you. Make sure you specify DOS II or DOS III if you send a disk.

Tink!Tonk!

Several months ago, I reviewed "Tonk in the Land of Buddy-Bots," an excellently designed children's program from Mindscape, Inc. Well, the Mindscape people have sent me two of their newer programs from their Tink!Tonk! software line which are equally appealing.

"Tuk Goes to Town" is intended to build spelling, vocabulary, and shape and pattern recognition skills through five games. "Tink's Adventure" is designed to teach ABC order and the computer keyboard layout through five games. Both of these programs combine an interactive story with an animated character controlled by the child. They also feature attractive, colorful graphics, and music.

The instruction manuals are easy to understand and well-illustrated, although I can't resist mentioning one small item that appeared in the "Tuk Goes to Town" manual. It gives the software copyright date as the year 1874. Either these people have been preparing this program quite some time, or, more likely, someone made a typographical error. I should point out, however, that this typo is in no way indicative of the overall quality of the manual or the game itself. If you have some four to eight year olds at home, I highly recommend that you consider these Mindscape programs.

Alarm Clock

Beep-beep-beep. It's time for our alarm clock program (yes, pun intended). Not only will it provide a constant display of the time on the screen while you program, but it can sound its alarm at any time you select.

The program is listed under the "ALARM CLOCK" heading. Enter it, save it and then run it. You are first asked to enter the current hour. That's easy enough -- type the hour and press RETURN. Next, you're asked for the current minute. Since the clock will not start immediately, enter a value one minute past the current minute.

Once the current hour and minute have been specified, you are asked to enter the alarm hour. Type the hour of the time you wish the alarm to sound. Following this, you're asked for the alarm minute. Enter the minute of the alarm time.

Now you'll get a "PRESS RETURN TO START THE CLOCK" message. When you press RETURN, the clock will appear on the top line of the screen and will start at zero seconds of the time you have entered. A flashing colon indicates that the clock is working. Since the clock lies on the first line of the display, you will not be able to type on this line -- the machine language routine contained within Alarm Clock will automatically move the cursor off this line, so you need not worry about it.

Granted, the clock is not 100% precise; it may lose about six seconds per hour. But for the time period you would be using your computer, this time loss is not very significant. The clock will also slow down somewhat while the disk drive is being accessed, and even more so while the cassette recorder is being used, so you should limit these operations if you desire to keep the clock more accurate.

When the clock reaches the time set for the alarm time, the alarm will begin beeping through the television speaker. Out of kindness, I will tell you that you can turn the alarm off by pressing the START key. The clock itself will remain operational.

You don't need to keep the alarm clock program in BASIC's memory for the clock to function. Alarm Clock stores a machine language routine onto page six of the computer's memory (a relatively safe area of RAM) where it is executed as part of the Atari's vertical blank routine. Therefore, you can type NEW and begin your own programming projects.

One more note: Alarm Clock should only be used with a Graphics 0 screen as it was designed to be used while programming in this mode.

Next Month

We'll learn how the alarm clock program works, and I'll include an assembly language listing. Also, we'll start our exciting Programming Tips section. And, don't be too surprised if you encounter an April Fools' program!

Readers' questions, comments and contributions are welcome. Address all correspondence to:

Jeff Brenner's
"Applying The Atari"
PO Box F,
Titusville, FL 32781-9990

ALARM CLOCK

```
TOJ 10 REM ALARM CLOCK
ENJ 20 REM BY JEFF BRENNER
Y6J 30 RESTORE 100:TOT=0
NEJ 40 FOR I=0 TO 192:READ N:POKE 1536+I,N:TOT=TOT+I+N:NEXT I
YTJ 50 IF TOT<>42303 THEN PRINT "ERROR - CHECK DATA":END
PVJ 60 PRINT "CURRENT HOUR";:INPUT A:GOSUB 140:POKE 207,A:IF E=1 THEN 60
VQJ 70 PRINT "CURRENT MINUTE";:INPUT A:GOSUB 160:POKE 206,A:IF E=1 THEN 70
LCJ 80 PRINT "ALARM HOUR";:INPUT A:GOSUB 140:POKE 1726,A:IF E=1 THEN 80
QZJ 90 PRINT "ALARM MINUTE";:INPUT A:GOSUB 160:POKE 1727,A:IF E=1 THEN 90
EDJ 100 PRINT "PRESS RETURN TO START CLOCK":POKE 764,255
MQJ 110 IF PEEK(764)=255 THEN 110
NTJ 120 POKE 204,0:POKE 205,0:SOUND 0,0,0,0:A=USR(1536)
PPJ 130 END
MWJ 140 E=0:IF A<0 OR A>12 THEN A=0:E=1:RETURN
MYJ 150 E=0:IF A<0 OR A>60 THEN A=0:E=1:RETURN
QXJ 160 B=INT(A/10):C=A-B*10:A=B*16+C:RETURN
YQJ 170 DATA 104,162,6,160,16,169,7,32,92,228,169,0,141,192,6,96,248
EDJ 180 DATA 162,0,181,204,24,105,1,149,204,201,96,208,24,169,0,149,204
GEJ 190 DATA 232,224,3,208,236,165,207,24,105,1,133,207,201,19,208,4,169
FWJ 200 DATA 1,133,207,224,2,144,17,165,207,205,190,6,208,10,165,206,205
YCJ 210 DATA 191,6,208,3,238,192,6,216,160,18,162,1,181,206,74,74,74
EIJ 220 DATA 74,9,144,145,88,200,181,206,41,15,9,144,145,88,200,200,202
OSJ 230 DATA 16,232,136,136,136,136,169,154,166,204,224,48,144,2,169,128,145
FWJ 240 DATA 88,136,136,177,88,201,144,208,4,169,0,145,88,173,192,6,240
FDJ 250 DATA 23,165,204,201,48,144,12,169,32,141,0,210,169,200,141,1,210
BWJ 260 DATA 208,5,169,160,141,1,210,173,31,208,201,6,208,11,169,0,141
ZAJ 270 DATA 0,210,141,1,210,141,192,6,165,84,208,5,169,143,141,252,2
IUZ 280 DATA 76,98,228,0,0,0
```


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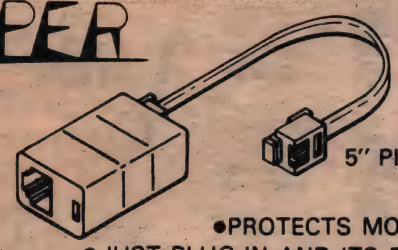

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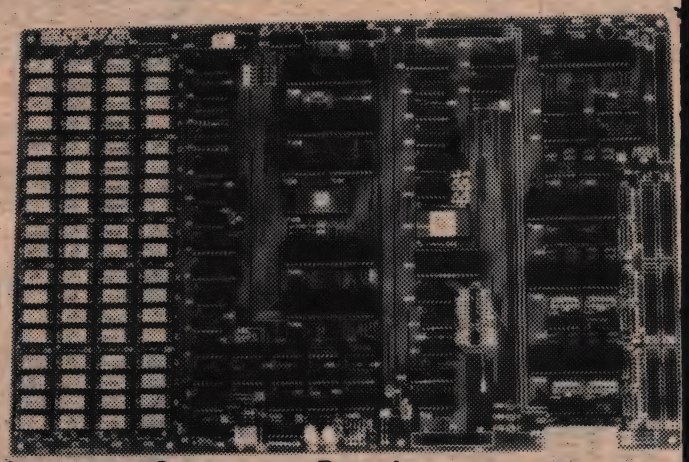

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APPLE II

The Eve II:
An Apple Compatible Portable

by Philip Chien

The Eve II is the latest in a long line of Apple clones but it has one advantage—being a transportable unit, with a built-in monitor. The entire unit, with two built-in disk drives, weighs 14 pounds. It is about the size of a portable stereo. Unfortunately, it does not come with any pockets to store cables or diskettes so you will still need another bag to carry those accessories. (Perhaps somebody is interested in coming out with a vinyl carrying case with enough room for the Eve and storage for the extra stuff.)

Eve comes with two built-in half-height disk drives. The drives are quite accurate when reading standard Apple DOS diskettes although the eject mechanism is a little "jerky." To use Eve, you must first boot the S&H program (TUD—The Utility Disk) which contains a legal copy of Apple DOS. This must be done whenever power is turned on. Should you want to boot any other program on the Eve, you must first boot the S&H program, exit it, and then boot your application. Careful examination of the boot code determines that the Eve checks to see if Track 0, Sector 0 Bytes F0-F2 has "S&H" ($D3 $A6 $C8)—apparently to make sure that the use of a licensed Apple DOS qualifies the machine to pass through United States Customs. Placing those bytes onto any standard Apple DOS diskette makes that diskette bootable on the Eve. Personally, I wish that the designers would eliminate all of the copyright problems by leaving the ROM (other than boot code) out of the computer and let the program/utility diskette load Applesoft and DOS into memory. This would eliminate the software copyright problems and provide the user with a more versatile machine which is a lot more than just an Apple copy. The Applesoft is the standard 90% copy, with lowercase input routines, and prints "Eve II" when the title command (CALL −1184, JSR $FB60) is called.

The Eve II computer sent for review comes with a "manual" consisting of 12 photocopied pages which tell little more than how to turn on the machine, use the utility diskette, and the commands used by "Eve DOS" (give me a break!!!). No information is given as far as how to open up the unit, install alternate I/O cards, or even the pin outs for the substandard (Male DB-9) Game I/O port. Although the Eve is advertised as CP/M compatible and comes with a CP/M card installed, the documentation does not mention the CP/M capabilities and it doesn't come with a CP/M diskette or license.

Eve II is a really neat, transportable Apple II clone. Here Phil Chien examines what makes it tick and reports on just how compatible it really is. If you need an Apple II in a small, complete package, look into the Eve II and read Phil Chien's evaluation.

The keyboard, an upper/lowercase full stroke keyboard with a built-in keypad, is built into the cover of the computer and is secured by latches when closed. It includes macros for BASIC (FOR, GOTO, HTAB, etc.) which are implemented by typing "CTRL-SHIFT" and various keys. Unfortunately, various important ASCII characters—including NUL (CTRL-SHIFT-P), RS (CTRL-SHIFT-N), and GS (CTRL-Shift-M)—are not available. This makes the Eve incompatible with many programs. The keyboard for the machine that I tested was "sticky," and occasionally mistyped characters. RESET is not protected (e.g. CTRL-RESET), and is very easy to hit by mistake. Hopefully, all of these problems will be corrected.

On the positive side, the motherboard is a surprisingly good design for a unit from Taiwan, with all IC's mounted in sockets, and 64K of 4164 RAM chips factory installed. Two drives are supplied, whereas many portables (including the Apple //c) have only one. The 5-inch amber screen is surprisingly readable, even in the 80 column mode, and there is an external video jack if you wish to attach a larger (or color) screen.

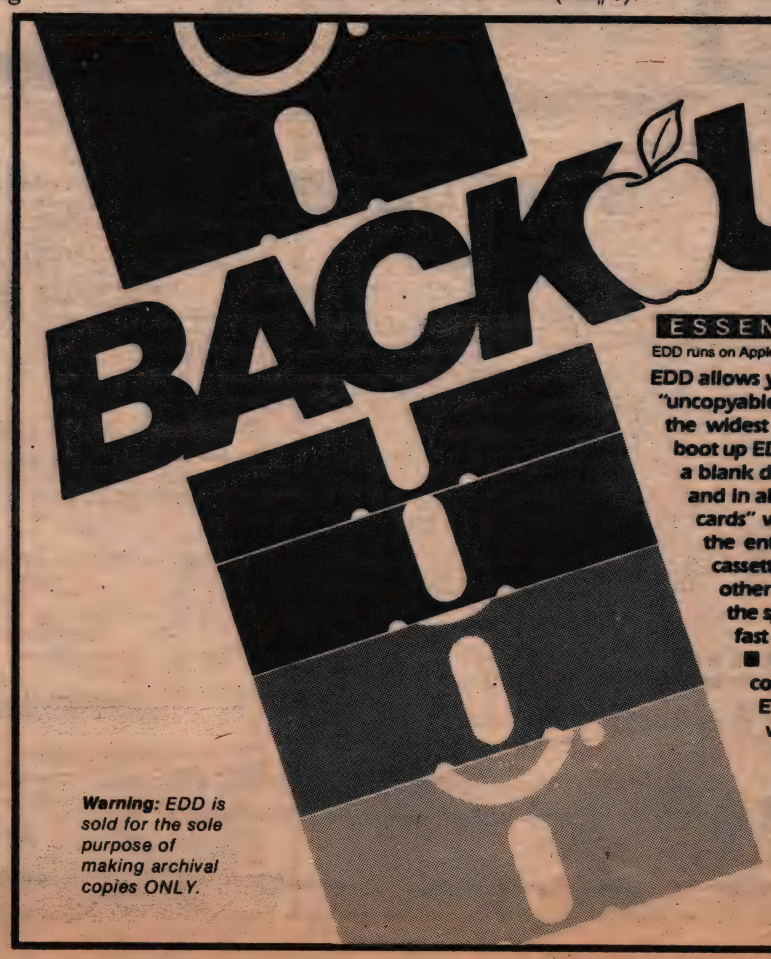
Using the Eve is relatively simple. After booting the S&H utility diskette, a menu is displayed with the various utilities available. Should you wish to run an application, you insert that program diskette, and do a warm boot (PR#6).

Eve II Portable Computer

I tested the Eve II with various programs, and found that most of them would work without problems. Applewriter II (with or without the Videx Pre-boot diskette), WordStar, and AE Pro all worked. The only problem with most programs is the lack of a softswitch. Since the 80 column card uses a hardswitch assembly instead of the usual softswitch, the user must know when to switch back and forth between the 40 and 80 column displays. Many programs don't prompt the user to switch displays, so if a program doesn't appear to show anything on the screen, just flip the display mode switch. However, contrary to advertisements, the Eve is NOT 100% Apple software or hardware compatible. Several different programs and hardware cards won't work. Some of the programs which won't work are: BPI Accounting, Mousepaint, Space Eggs, and the ProDOS Users disk, among others. Various different hardware devices will not work with the Eve either for assorted reasons.

Maintenance of the unit may be difficult for an inexperienced user. The cover is attached with four screws, but once the unit is opened, the in-

Continued on page 67



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Computer Jack Built
Continued from page 53

screen does not seem to make much sense.

The star of the 65XE line, we feel, will be the Atari 130XE with 131,072 cbytes of RAM memory. With this extra memory available for animation and extended graphics, users will be able to do really interesting things with the 8-bit line.

And Now For Something New From Atari

The 65XE 8-bit line are merely new versions of the 800XL computers, but Jack Tremiel promised new things from Atari and here they are—the Atari 130ST and 520ST, two new 16-bit M68000 based computers with all the bells and whistles of the higher priced 16-biters. The secret is in the software, and Atari has incorporated Digital Research's GEM graphics environment into their TOS operating system. This includes such features as Icons, Drop-down menus, Windows, Vector drawing, GEM virtual device interface and application services. The graphics and screen applications are controlled by a two-button Mouse.

There are three graphics' modes: Low resolution (320 x 200 pixels), Medium resolution (640 x 200 pixels), and High Resolution (640 x 400 pixels). In the medium and high resolution modes, there are 512 colors available—eight levels each of red, green and blue.

The music capability of the ST series has three voices, and a range from 30Hz to above audible range. There are separate frequency and volume controls provided. The MIDI interface controls external music synthesizers.

The ST series has both a Centronics printer port and RS232C Serial for a modem or serial printer. Controllers for both a floppy disk interface and a hard disk are built in. There are two joystick ports and one is configured for the two button mouse.

The floppy disk system uses 3½" disks with capacities of either 250K or 500K capacity. There is also a 3½" hard disk of 10 Mbyte capacity available. In spite of all the disk-based input, cartridge input is still available for the ST computers.

The keyboard is an ergonomic design with a good feel and an 18-key keypad. There is a cursor control cluster for easy use. The video line-up includes the ability to use a T.V., low-resolution composite video, medium-resolution RGB monitor and a high-resolution monochrome monitor.

ATARI 130ST PERSONAL COMPUTER

The 130ST comes with 131,072 bytes of RAM and

Continued on page 60

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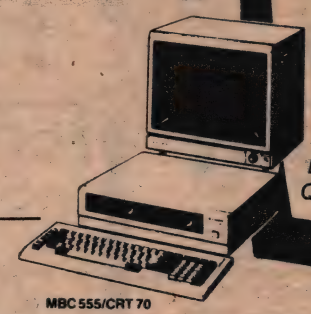
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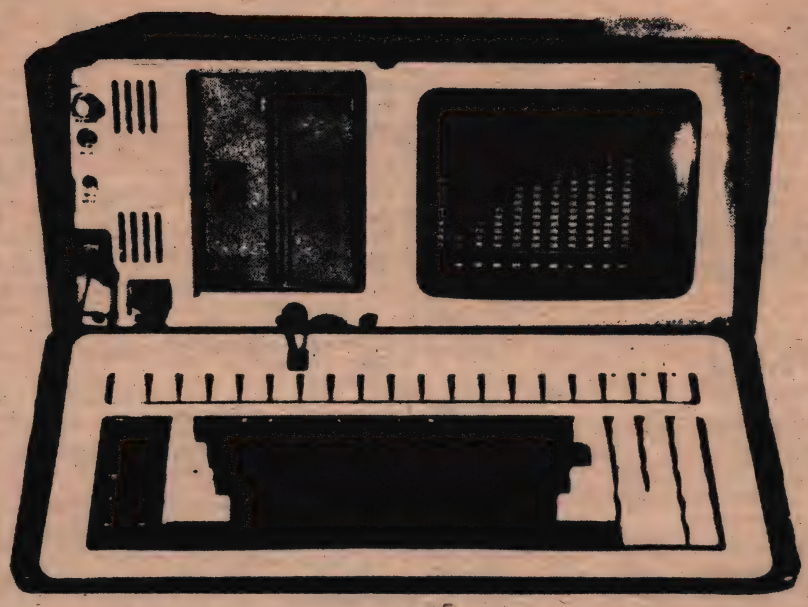

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ZORBA uses CP/M, the industry standard operating system, which means that a wide range of existing software is readily available to the user.

The ZORBA users manual covers operation of the unit, all supplied software and all interface and internal information. A system diskette is supplied with all system files and utilities. A second diskette contains the sources for all ZORBA software including BIOS, SETUP, FORMAT, and PATCH.

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Applying the Atari

by Jeff Brenner

This month's feature program is an on-screen alarm clock, ideal for those of you who have difficulty pulling away from your Atari to sleep, eat, work, etc. We'll also enter a joystick-tester program and a printer utility, and we'll look at two children's programs from Mindscape.

Adios Adam

At this writing, Coleco Industries Inc. officially dropped its Adam computer. It had been a tough, long year and a half for the Adam from the day of its planned introduction in June of 1983. If not for their Cabbage Patch Kids, Coleco's story might have been a much, much sadder one. So you see, folks, Atari has lived to witness the fall of yet another competing computer product.

Atari News

A few days after Coleco's announcement, Atari displayed several of its new computers at the Las Vegas Winter Consumer Electronics Show. The new machines make up the "XE" line. One is a 64K, XL-compatible portable. The others are Atari's first 16-bit units. We'll have more details on these models next month.

Reader Mail

I got this idea for a joystick testing program after an incident I had with a new game program. For days I tried to figure out why the game wasn't working like it was supposed to. Just when I was ready to bring the game back to the store, I found out that my joystick was not registering the up, or diagonally-up directions! Just run the program and move the joystick to each of the positions shown in the picture on the screen. If the joystick is O.K. the program will say so. Otherwise, it will not let you go on past the non-working direction. It also checks the joystick trigger. I hope your readers find it handy.

Ricky Freeman
Baton Rouge, Louisiana

I'm sure they will. The program is listed under the "JOYSTICK TESTER" heading and has been slightly modified to facilitate its printing in the magazine. Thanks for writing.

I'm a novice Atari user and recently bought an Epson RX-80 printer. I'm very interested in using the printer to create graphics. A salesman told me I need a "screen dump," but since I am not familiar with this I am asking for your help.

B.E. Grant
Newark, New Jersey

Very simply, a screen dump

Continued on page 61

```
JOYSTICK TESTER


INE 10 REM JOYSTICK TESTER
PNE 15 POKE 82,15:PRINT CHR$(125)
MJJ 20 READ A:IF A=-1 THEN PRINT :GOTO 20
NEE 30 IF A>-2 THEN PRINT CHR$(A);:GOTO 20
SNE 35 POKE 82,2:PRINT
MOJ 40 FOR I=1 TO 8:READ VALUE
CKJ 50 PRINT "MOVE JOYSTICK TO POSITION #";I
HPJ 60 IF STICK(0)<>VALUE THEN GOTO 60
OEJ 70 SOUND 0,10,12,8:FOR J=1 TO 50:NEXT J
KTJ 80 SOUND 0,0,0,0:PRINT "GOOD":NEXT I
FMJ 90 PRINT :PRINT "PRESS TRIGGER"
VAE 100 IF STRIG(0)=1 THEN GOTO 100
MTE 105 PRINT "GOOD"
YUJ 110 PRINT :PRINT "JOYSTICK IS WORKING!"
POJ 120 END
MKJ 130 DATA 49,32,32,50,32,32,51,-1
EWJ 140 DATA 32,7,32,124,32,6,-1
YIJ 150 DATA 32,32,7,124,6,-1
MWJ 160 DATA 52,18,18,20,18,18,53,-1
YKJ 170 DATA 32,32,6,124,7,-1
FAJ 180 DATA 32,6,32,124,32,7,-1
MXJ 190 DATA 54,32,32,55,32,32,56,-2
FLZ 200 DATA 10,14,6,11,7,9,13,5
```

S.A.M.

Continued from page 58

be able to spell to program a word - you only need to be able to say it! The English-to-text program does a very respectable job in producing speech, but it does make mistakes. The most intelligible speech is produced using direct phonetic input, which allows placing inflection in speech and permits fine control of word pronunciation. Using phonetics is a bit tedious, and in itself uses more memory, since a word spelled phonetically almost always takes more characters than the straight English spelling. All of the demonstration programs and the English-to-text program can be copied onto your own DOS 2.0S disk. You cannot make a back-up copy of the actual speech synthesis program. A replacement copy can be obtained for $5.00, though. If you aspire to sell programs utilizing S.A.M., a licensing agreement can be obtained from Don't Ask Software. The manual is well written, and will enable you to begin talking through your Atari in short order. If, however, your application requires a simultaneous screen display and voice, then S.A.M. won't be able to do a very good job. But for easy to obtain and good sounding voice synthesis, S.A.M. is an excellent choice. The Software Automatic Mouth is available through

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Computer Jack Built

Continued from page 56

196K of ROM expandable to 320K with plug-in cartridges. The 520ST increases the RAM to 520K bytes. Language available at this time include BASIC and Logo.

Conclusions

You may read this and ask the most natural question 'How much will all this cost?" As with the Commodore 128, we do not know. Prices were not announced, but rumors flew everywhere. The 65XE series was rumored to be in the "$200 price range," the 130ST "around $600," the hard disk $500. None of these speculations drew more than a smile from the Atari crew. The motto of the New Atari Company is "Power Without The Price." They have lived up to half of their motto. They have shown the power, but they have not given us the price!

The level of press cooperation has not changed at all at Atari. Their press kit was hardly complete, lacking even a phone number and a contact person within the company. Mr. James L. Copeland, VP Marketing, was listed as the contact person. We tried to contact Mr. Copeland after the show but no telephone number was given for him. We tried the general number and all we got was a recording telling us the lines were busy. Oh yes, they will publish their own magazine called Atari Explorer, which will get all the information first and will be their user contact.

MacUniverse
Continued from page 71

ment size is only limited by disk size (currently 400K). As with anything else, your universe master will believe it when he sees it.

Here is a Mac warning. If you have been given MacWrite version 3.5 by your friendly neighborhood Apple dealer, make sure you have a lot of backups. Supposedly, this version is full of nasty bugs that randomly bombs text files.

Finally there is a rumor that sometime this year Apple will release a new disk drive, supposed double sided, that will store 800K on a diskette. If this happens, and MacWrite can use virtual memory, then MacWrite may finally become a serious word processor.

For those of you who have two disk drives, here is a quick and dirty way to eject the disks from both drives. After you quit your application and have the initial Mac window visible go to heading File, pull down its menu and select the command "Close All." Once this is done, all the windows should close. Next go to the heading Edit and pull down its menu; click on the option "Select All" (hitting the command key and "A" will accomplish the same thing). At this point, all of your icons will be highlighted. Finally, go back to the File menu and select the eject command (command "E" does the same thing). Your disks will then be ejected. Do not try this without closing all the files. If you eject a disk with an open file, you may be unable to later access that file.

Recently two books from Microsoft Press have come across my desk. The first, by Steven Lambert, is entitled *Presentation Graphic on the Apple Macintosh* (ISBN 0-914845-11-X). Its suggested retail price is $18.95. This book is an in-depth analysis on how to get the most out of Microsoft's Chart program. I would recommend this book highly for any Chart user or potential user. Spend two hours using the Chart program with this book and you will be

Continued on page 74

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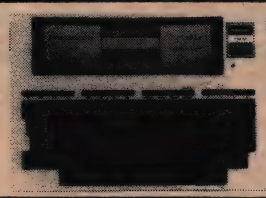

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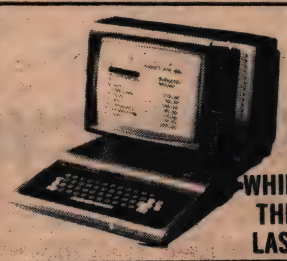

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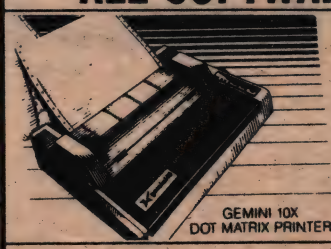

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MacUniverse
Continued from page 73

doing things with Chart you never thought were possible.

The second book, *Silicon Valley Guide to Financial Success in Software* by Robert Dunaway, Daniel Remer and Paul Remer (ISBN 0-914845-09-8), has a suggested retail price of $19.95. Change the title and examples and this book could be about financial success in the cookie business, the magazine business, the clothing business, or any business for that matter. It is nothing more than a book on how to start and run a business. The best that can be said about the book is that it presents the information in a nice, breezy way using a lot of "real life" examples and name dropping. The worse that can be said about it is that it oversimplifies complex legal matters. For example, it says the "Office of Export Administration has adopted regulations that restrict the export of certain computer hardware and software." In reality, if you want to mail 500 copies of Pac-Man or any other similar arcade game to the United Kingdom, you need two export licenses; one for the magnetic media and another for the software (almost all software, except public domain and that printed in computer magazines) is classified as "General Technical Data Restricted." I feel this is the kind of book that is read once and then thrown away. If you really want a good grasp on how to start a business, attend a seminar given by the Small Business Administration or a local university.

For those of you who want to learn how to touch type, your universe master recommends Palantir Software's MacType. It is not cheap ($49.95), but it does have two unique features. First, it can teach you either the QWERTY or DVORAK keyboard. Secondly, it is designed so it can be used in the educational market. Each MacType diskette can hold over 100 students' records. The only thing unacceptable with MacType is that it comes copy protected and the publisher has a general policy of not selling backup copies.

The truly outstanding product of the month is the Desk Accessory Mover by CE Software. This product allows you to permanently remove unneeded desk accessories (e.g. the scrapbook, the alarm clock, note pad, calculator, key caps, control panel, and puzzle) from your Mac disks. If you have a one disk Mac, this program will free up valuable disk space. The Desk Accessory Mover is not for sale by any computer store as it is being distributed on the MacHonor System. You can get your copy by either downloading it from the MAUG SIG database on CompuServe (page PCS-51) or sending a blank diskette and self-addressed, stamped envelope to CE Software. If, and only if, you like the program, are you to pay $15 for it.

Two disk copy programs have come across my desk. These programs will make duplicates of your copy protected master diskettes. Under the law any copies you make must be for your personal use. You may not make a copy to give or sell to a third party while you keep the original. The two programs are MACBAK.BAS and Copy II MAC. MACBAK.BAS is a free BASIC language program available on the DL4 database of CompuServe's MAUG. To utilize MACBAK.BAS you must have

Continued on page 79

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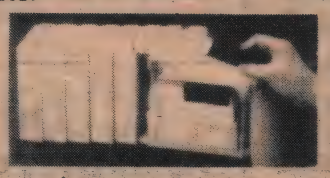

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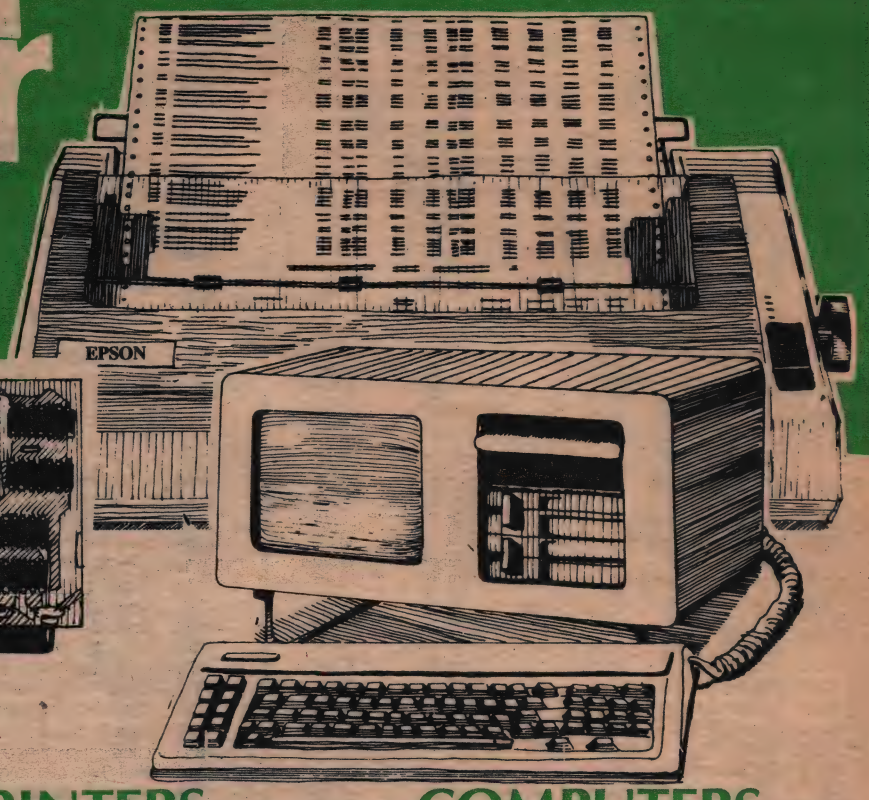

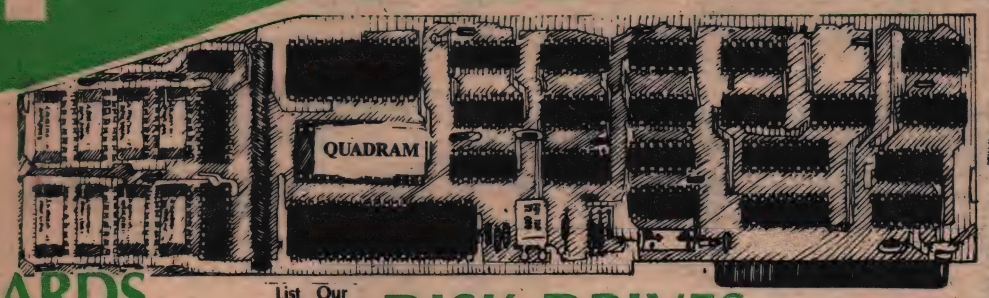

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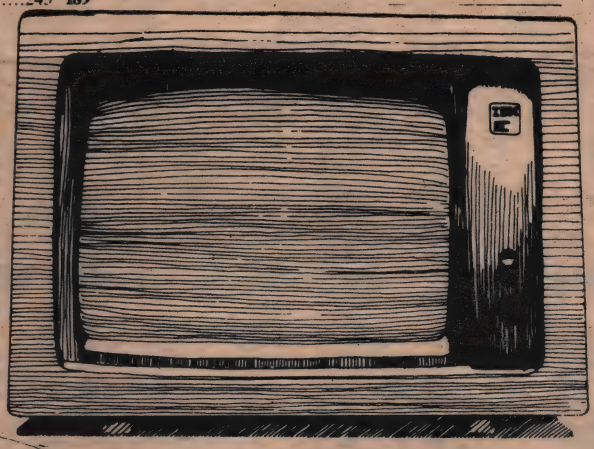

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Applying The Atari
Continued from page 61

Perfect in next month's column. If you can't wait, you can send me a self-addressed, stamped envelope for a listing, or send a cassette or formatted disk and $2.00 for handling and return postage and I will make a copy for you. Make sure you specify DOS II or DOS III if you send a disk.

Tink!Tonk!

Several months ago, I reviewed "Tonk in the Land of Buddy-Bots," an excellently designed children's program from Mindscape, Inc. Well, the Mindscape people have sent me two of their newer programs from their Tink!Tonk! software line which are equally appealing.

"Tuk Goes to Town" is intended to build spelling, vocabulary, and shape and pattern recognition skills through five games. "Tink's Adventure" is designed to teach ABC order and the computer keyboard layout through five games. Both of these programs combine an interactive story with an animated character controlled by the child. They also feature attractive, colorful graphics, and music.

The instruction manuals are easy to understand and well-illustrated, although I can't resist mentioning one small item that appeared in the "Tuk Goes to Town" manual. It gives the software copyright date as the year 1874. Either these people have been preparing this program quite some time, or, more likely, someone made a typographical error. I should point out, however, that this typo is in no way indicative of the overall quality of the manual or the game itself. If you have some four to eight year olds at home, I highly recommend that you consider these Mindscape programs.

Alarm Clock

Beep-beep-beep. It's time for our alarm clock program (yes, pun intended). Not only will it provide a constant display of the time on the screen while you program, but it can sound its alarm at any time you select.

The program is listed under the "ALARM CLOCK" heading. Enter it, save it and then run it. You are first asked to enter the current hour. That's easy enough -- type the hour and press RETURN. Next, you're asked for the current minute. Since the clock will not start immediately, enter a value one minute past the current minute.

Once the current hour and minute have been specified, you are asked to enter the alarm hour. Type the hour of the time you wish the alarm to sound. Following this, you're asked for the alarm minute. Enter the minute of the alarm time.

Now you'll get a "PRESS RETURN TO START THE CLOCK" message. When you press RETURN, the clock will appear on the top line of the screen and will start at zero seconds of the time you have entered. A flashing colon indicates that the clock is working. Since the clock lies on the first line of the display, you will not be able to type on this line -- the machine language routine contained within Alarm Clock will automatically move the cursor off this line, so you need not worry about it.

Granted, the clock is not 100% precise; it may lose about six seconds per hour. But for the time period you would be using your computer, this time loss is not very significant. The clock will also slow down somewhat while the disk drive is being accessed, and even more so while the cassette recorder is being used, so you should limit these operations if you desire to keep the clock more accurate.

When the clock reaches the time set for the alarm time, the alarm will begin beeping through the television speaker. Out of kindness, I will tell you that you can turn the alarm off by pressing the START key. The clock itself will remain operational.

You don't need to keep the alarm clock program in BASIC's memory for the clock to function. Alarm Clock stores a machine language routine onto page six of the computer's memory (a relatively safe area of RAM) where it is executed as part of the Atari's vertical blank routine. Therefore, you can type NEW and begin your own programming projects.

One more note: Alarm Clock should only be used with a Graphics 0 screen as it was designed to be used while programming in this mode.

Next Month

We'll learn how the alarm clock program works, and I'll include an assembly language listing. Also, we'll start our exciting Programming Tips section. And, don't be too surprised if you encounter an April Fools' program!

Readers' questions, comments and contributions are welcome. Address all correspondence to:

Jeff Brenner's
"Applying The Atari"
PO Box F,
Titusville, FL 32781-9990

ALARM CLOCK

```
TOJ 10 REM ALARM CLOCK
ENJ 20 REM BY JEFF BRENNER
Y6J 30 RESTORE 100:TOT=0
NEJ 40 FOR I=0 TO 192:READ N:POKE 1536+I,N:TOT=TOT+I+N:NEXT I
YTJ 50 IF TOT<>42303 THEN PRINT "ERROR - CHECK DATA":END
PVJ 60 PRINT "CURRENT HOUR";:INPUT A:GOSUB 140:POKE 207,A:IF E=1 THEN 60
VQJ 70 PRINT "CURRENT MINUTE";:INPUT A:GOSUB 160:POKE 206,A:IF E=1 THEN 70
LCJ 80 PRINT "ALARM HOUR";:INPUT A:GOSUB 140:POKE 1726,A:IF E=1 THEN 80
QZJ 90 PRINT "ALARM MINUTE";:INPUT A:GOSUB 160:POKE 1727,A:IF E=1 THEN 90
EDJ 100 PRINT "PRESS RETURN TO START CLOCK":POKE 764,255
MQJ 110 IF PEEK(764)=255 THEN 110
NTJ 120 POKE 204,0:POKE 205,0:SOUND 0,0,0,0:A=USR(1536)
PPJ 130 END
MWJ 140 E=0:IF A<0 OR A>12 THEN A=0:E=1:RETURN
MYJ 150 E=0:IF A<0 OR A>60 THEN A=0:E=1:RETURN
QXJ 160 B=INT(A/10):C=A-B*10:A=B*16+C:RETURN
YQJ 170 DATA 104,162,6,160,16,169,7,32,92,228,169,0,141,192,6,96,248
EDJ 180 DATA 162,0,181,204,24,105,1,149,204,201,96,208,24,169,0,149,204
GEJ 190 DATA 232,224,3,208,236,165,207,24,105,1,133,207,201,19,208,4,169
FWJ 200 DATA 1,133,207,224,2,144,17,165,207,205,190,6,208,10,165,206,205
YCJ 210 DATA 191,6,208,3,238,192,6,216,160,18,162,1,181,206,74,74,74
EIJ 220 DATA 74,9,144,145,88,200,181,206,41,15,9,144,145,88,200,200,202
OSJ 230 DATA 16,232,136,136,136,136,169,154,166,204,224,48,144,2,169,128,145
FWJ 240 DATA 88,136,136,177,88,201,144,208,4,169,0,145,88,173,192,6,240
FDJ 250 DATA 23,165,204,201,48,144,12,169,32,141,0,210,169,200,141,1,210
BWJ 260 DATA 208,5,169,160,141,1,210,173,31,208,201,6,208,11,169,0,141
ZAJ 270 DATA 0,210,141,1,210,141,192,6,165,84,208,5,169,143,141,252,2
IUZ 280 DATA 76,98,228,0,0,0
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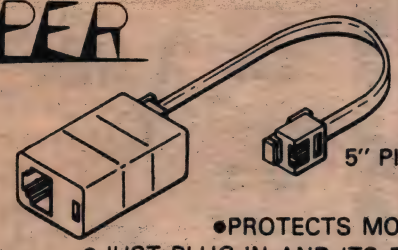

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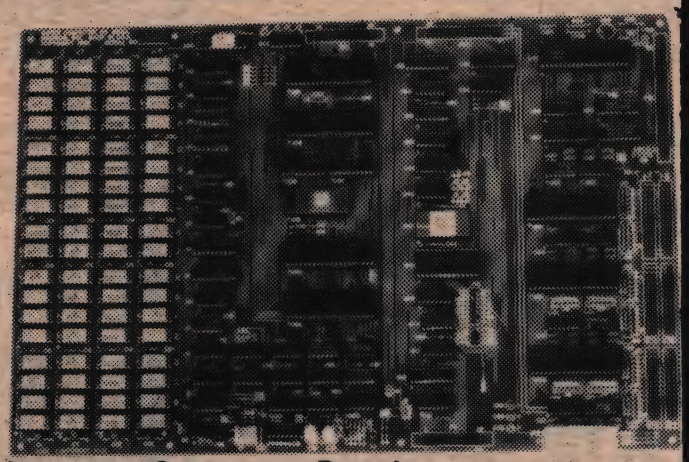

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APPLE II

The Eve II:
An Apple Compatible Portable

by Philip Chien

The Eve II is the latest in a long line of Apple clones but it has one advantage—being a transportable unit, with a built-in monitor. The entire unit, with two built-in disk drives, weighs 14 pounds. It is about the size of a portable stereo. Unfortunately, it does not come with any pockets to store cables or diskettes so you will still need another bag to carry those accessories. (Perhaps somebody is interested in coming out with a vinyl carrying case with enough room for the Eve and storage for the extra stuff.)

Eve comes with two built-in half-height disk drives. The drives are quite accurate when reading standard Apple DOS diskettes although the eject mechanism is a little "jerky." To use Eve, you must first boot the S&H program (TUD—The Utility Disk) which contains a legal copy of Apple DOS. This must be done whenever power is turned on. Should you want to boot any other program on the Eve, you must first boot the S&H program, exit it, and then boot your application. Careful examination of the boot code determines that the Eve checks to see if Track 0, Sector 0 Bytes F0-F2 has "S&H" ($D3 $A6 $C8)—apparently to make sure that the use of a licensed Apple DOS qualifies the machine to pass through United States Customs. Placing those bytes onto any standard Apple DOS diskette makes that diskette bootable on the Eve. Personally, I wish that the designers would eliminate all of the copyright problems by leaving the ROM (other than boot code) out of the computer and let the program/utility diskette load Applesoft and DOS into memory. This would eliminate the software copyright problems and provide the user with a more versatile machine which is a lot more than just an Apple copy. The Applesoft is the standard 90% copy, with lowercase input routines, and prints "Eve II" when the title command (CALL −1184, JSR $FB60) is called.

The Eve II computer sent for review comes with a "manual" consisting of 12 photocopied pages which tell little more than how to turn on the machine, use the utility diskette, and the commands used by "Eve DOS" (give me a break!!!). No information is given as far as how to open up the unit, install alternate I/O cards, or even the pin outs for the substandard (Male DB-9) Game I/O port. Although the Eve is advertised as CP/M compatible and comes with a CP/M card installed, the documentation does not mention the CP/M capabilities and it doesn't come with a CP/M diskette or license.

Eve II is a really neat, transportable Apple II clone. Here Phil Chien examines what makes it tick and reports on just how compatible it really is. If you need an Apple II in a small, complete package, look into the Eve II and read Phil Chien's evaluation.

The keyboard, an upper/lowercase full stroke keyboard with a built-in keypad, is built into the cover of the computer and is secured by latches when closed. It includes macros for BASIC (FOR, GOTO, HTAB, etc.) which are implemented by typing "CTRL-SHIFT" and various keys. Unfortunately, various important ASCII characters—including NUL (CTRL-SHIFT-P), RS (CTRL-SHIFT-N), and GS (CTRL-Shift-M)—are not available. This makes the Eve incompatible with many programs. The keyboard for the machine that I tested was "sticky," and occasionally mistyped characters. RESET is not protected (e.g. CTRL-RESET), and is very easy to hit by mistake. Hopefully, all of these problems will be corrected.

On the positive side, the motherboard is a surprisingly good design for a unit from Taiwan, with all IC's mounted in sockets, and 64K of 4164 RAM chips factory installed. Two drives are supplied, whereas many portables (including the Apple //c) have only one. The 5-inch amber screen is surprisingly readable, even in the 80 column mode, and there is an external video jack if you wish to attach a larger (or color) screen.

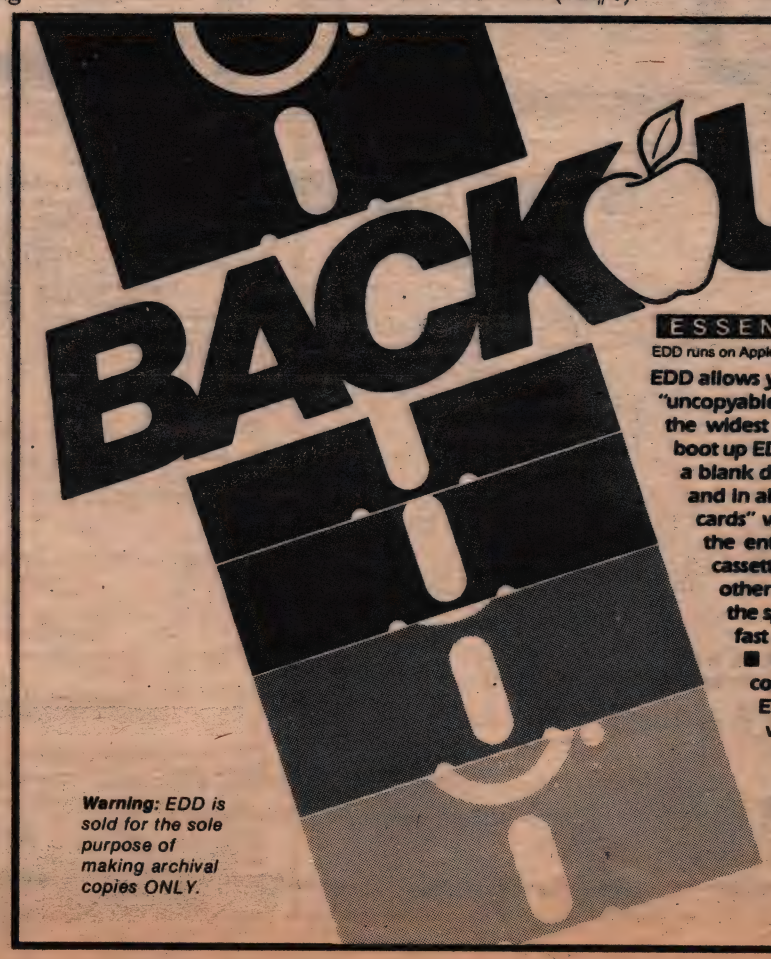
Using the Eve is relatively simple. After booting the S&H utility diskette, a menu is displayed with the various utilities available. Should you wish to run an application, you insert that program diskette, and do a warm boot (PR#6).

Eve II Portable Computer

I tested the Eve II with various programs, and found that most of them would work without problems. Applewriter II (with or without the Videx Pre-boot diskette), WordStar, and AE Pro all worked. The only problem with most programs is the lack of a softswitch. Since the 80 column card uses a hardswitch assembly instead of the usual softswitch, the user must know when to switch back and forth between the 40 and 80 column displays. Many programs don't prompt the user to switch displays, so if a program doesn't appear to show anything on the screen, just flip the display mode switch. However, contrary to advertisements, the Eve is NOT 100% Apple software or hardware compatible. Several different programs and hardware cards won't work. Some of the programs which won't work are: BPI Accounting, Mousepaint, Space Eggs, and the ProDOS Users disk, among others. Various different hardware devices will not work with the Eve either for assorted reasons.

Maintenance of the unit may be difficult for an inexperienced user. The cover is attached with four screws, but once the unit is opened, the in-

Continued on page 67



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Ask The Guru

by Don Lancaster

Ask the Guru (column one)

Welcome to a brand new Computer Shopper feature column. I'll do what I can here to find answers to reader hardware, software, or supply problems. Just give me a call or write per the address in the end box. Best calling times are 8-5 weekdays, mountain standard time. I'll send a free booklist and a special goodies list to you when you respond.

What is the word on ProDOS Applewriter 2.0?

There is a brand new upgrade of *Applewriter* out. It runs under the ProDOS operating system, and has bunches of new features. These include faster operation, better compatibility with other ProDOS programs, easy hard disk access, a built-in send and receive modem, settable screen margins for "what you see is what you get," spreadsheet editing to 240 columns, an optional page/position display, and many other improvements and performance upgrades.

Best of all, the new version is unlocked, unprotected, and freely copyable for any number of backups. Even the source code is capturable.

What's wrong with it? Very little. A few parallel printer cards will not work properly on first try, notably the *Grappler* and the *Pkaso*. See the next question for a free patch. The NULL patch for Epson superscripts is no longer needed, since a [ ] can be substituted. The "shortline" problem remains, but you can write me for a separate free patch on this.

I've been able to personally add full microjustify and proportional space, author's keyword indexing, multiple columns, HIRES dumps, unique self-prompting glossaries, code extensions, and many other goodies to it.

Cost of the latest ProDOS 2.0 version is $150 from your local Apple dealer. There is a $50 upgrade service if you send in any older Applewriter first factory disk and a manual cover to *Applewriter Upgrade*. Apparently, this price even applies to old, old Applewriter 1.0 or 1.1. The upgrade is a fantastic bargain.

How can I use my Grappler card with ProDOS Applewriter 2.0?

Some parallel printer cards may do very bizarre things to *ProDOS Applewriter 2.0* output. The usual *Grappler* symptom is a burst of 20 spaces every 240 characters. The cause is the grappler card thinking it is intelligent, and then thoroughly rearranging

Continued on page 80

MacUniverse
Continued from page 74

Microsoft BASIC (version 1.1) and an external disk drive. It does a sector by sector copying. It can copy some but not all protected software. For example, it will copy MultiPlan and ThinkTank 128 but not copy MacPascal or Filevision. For those of you who want a more powerful duplicator try Copy II Mac by Central Point Software. For $39.95 you get a program that (1) makes bit copy, (2) can make files invisible or visible, and (3) locks or unlocks files. Copy II Mac appears to be able to copy anything and everything.

Another free program you should get off MAUG is BINHEX.HEX, located in DL4. It is a program used to convert text versions of binary application programs back to usable applications. For example, you can use it to download and upload MacPaint artwork, user created MacWrite fonts, the Desk Accessory Mover (mentioned above), and the like. To get BINHEX.HEX you must first download the file BINHEX.V30. This program, written in BASIC, needs MicroSoft Basic, version 1.1 to run. It does the same thing that BINHEX.HEX does only much slower. After BINHEX.V30 is downloaded and working, use it to download BINHEX.HEX. Use BINHEX.V30 to convert BINHEX.HEX to a file called BINHEX.TEM. Then use BINHEX.TEM to convert BINHEX.HEX into BINHEX. Once this is done, you are home free.

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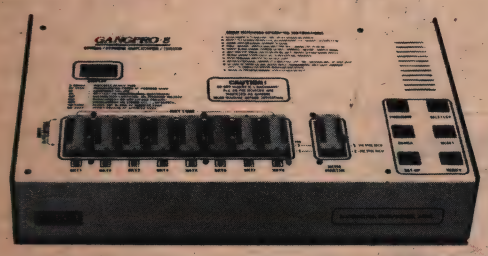

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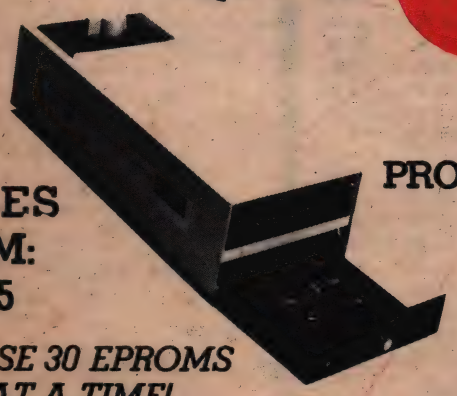

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Ask The Guru Continued from page 79

"GRAPPLIFIER" PATCH
- for -
ProDOS APPLEWRITER 2.0

1. Make a third backup copy of ProDOS Applewriter 2.0.
2. Get into /BASIC.SYS.
3. BLOAD AWD.SYS, A$2000, E$6020, TSYS, D2.
4. [A.] Verify: $4CA0- 6C 9E 00
   [B.] Change: $4CA0: 4C F0 5F
5. [A.] Verify: $5FF0- 1A 1A 1A 1A . . .
   [B.] Change: $5FF0: A0 00 8C 79 04 8C F9 07
   $5FF8: C8 84 24 C8 8C F9 04 6C
   $6000: 9E 00
6. [A.] Verify: $4CA0-4CA2
   [B.] Verify: $5FF0-6001
7. BSAVE AWD.SYS, A$2000, E$6020, TSYS.

NOTE: For 80 column IIc or 128K IIe only!
For SLOT ONE only!

FIG. 1

the word processor's already correct output to suit itself.

The general solution to most card hassles are to (1) defeat all video echo; (2) don't assume anything about page zero location $0024, because it is not connected to anywhere; and (3) make sure the card's internal cursor is always between the card's left and right margin stashes. These commands should be done for each and every character that is sent out to be printed.

You'll find the specific patch for the Grappler in figure one. Be sure to apply this patch only to your third or higher backup copies, and plainly mark your copy as **Grappler** modified.

Known side effects: Usable only in slot one, and then only on the AWD.SYS version intended for the IIc and the 128K IIe. May do very strange and wondrous things to non-Grappler cards in slot one. The frontal lobotomy performed on the Grappler by the patch is only local and temporary.

Patches for other slots, for other cards, for 40 column IIc displays, or for 64K IIe's are "alike but different somehow."

I have lots of other free patches available, both for older Applewriter IIe and new ProDOS Applewriter 2.0, including NULL and SHORTLINE fixes. Just ask for them.

By the most astounding coincidence, I also have my own $59.50 **sixteen** diskette side toolkit that really puts a final polish on Applewriter. Needless to say, I am not completely adverse to selling you one. You can order directly from *Synergetics*.

I need a digital divide-by-seven

This is a tad heavy and specialized for this column, but since it shows us some important fundamentals, let's have at it.

Say you want some oddball math function or something else that is complicated but not totally irrational. How do you do it?

First, you must ask whether you want to use hardware or software. Software, once developed, is cheap and easily changed for upgrades or customization. It is infinitely duplicated with little or no cost or on-hand inventory.

Software is usually far and away your best choice.

On the other hand, hardware is usually much faster and is called for whenever operating speed is super important. Hardware is also needed if your circuit is so simple that it does not already have a CPU-RAM-ROM setup already inside it and ready to go. Or, if your CPU has better or more important things that need done right now.

Secondly, you must ask whether you are going to look up the answer or calculate it.

Continued on page 83

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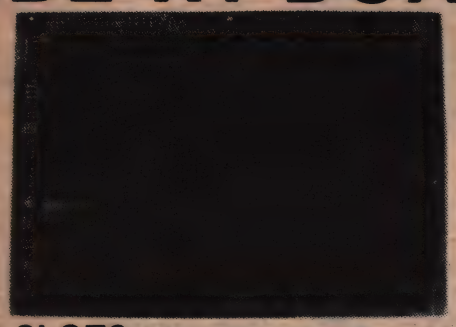

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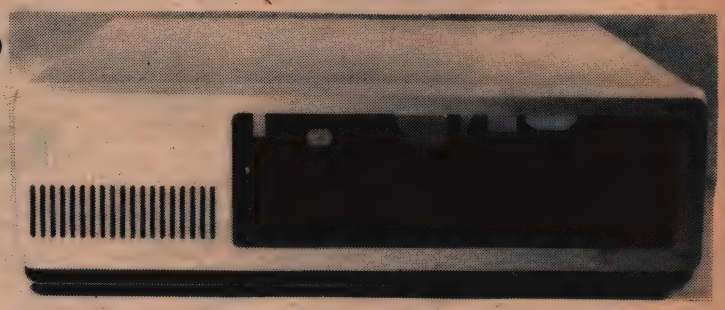

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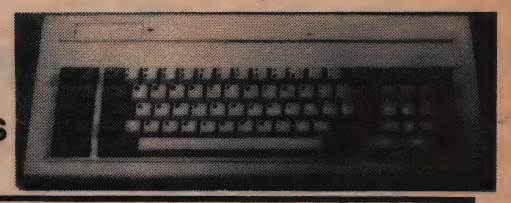

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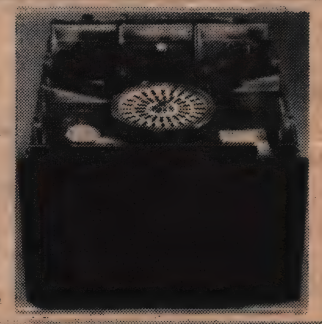

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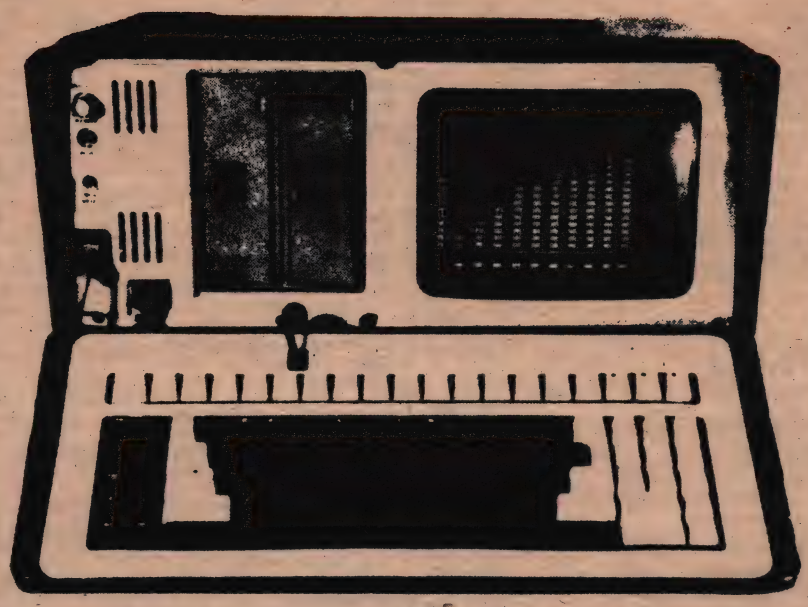

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ZORBA uses CP/M, the industry standard operating system, which means that a wide range of existing software is readily available to the user.

The ZORBA users manual covers operation of the unit, all supplied software and all interface and internal information. A system diskette is supplied with all system files and utilities. A second diskette contains the sources for all ZORBA software including BIOS, SETUP, FORMAT, and PATCH.

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Keyboard communicates serially with CPU
Detachable with 2 foot coiled cord
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13 Key Numeric pad
Independent Caps Lock and Shift Lock
55 Software programmable function keys
All keys auto-repeat after 1 second delay
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Disk System

Controller:	WD1793
Drives:	5.25 Double Sided, Double Density, 400K 48 TPI

Built-in disk interchange formats: Xerox 820 (SD, DD), Kaycomp (DD), DEC VT-180 (SD), Osborne (SD) and IBM-PC (eg. CPM/86) and Televideo 802 (Read/Write and Format compatibility) (Expandable to 61 Formats)

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Width	-17.5 inches (44.45 cm)
Height	- 9.0 inches (22.86 cm)
Depth	-16.0 inches (40.64 cm)
Weight	-24.6 pounds (11.1 Kg)
Power	-80-130 VAC or 190-245 VAC 50/60 Hz 170 watts max

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Display Tube:
9" diagonal, Green or Amber
High resolution display circuitry
60 Hz refresh rate

Display Format:
25 lines x 80 columns
5x7 Character Font with full descenders
128 ASCII Characters
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MACINTOSH

MacUniverse - 2

by L.J. Kutten

It has been a busy month and your universe has a lot to tell about the books and new software that magically appeared on his desk. But before I begin telling you the good stuff I want to publicly air some complaints about the Macintosh.

My first complaint deals with Apple's Imagewriter printer. I have come to dislike the way its tractor feed is set up. Compared to most dot matrix printers, the tractor feed's left socket is basically immovable. What reason caused Apple to design it that way? Would it have been that hard to design a printer where both sprockets are completely movable? This "design features" aggravates me because MacWrite has a minimum one inch left margin. When I use MacWrite and the tractor feed to print on mailing labels four inches wide I can only print three inches of material. But if the left tractor feed sprockets was truly movable then I could move the sprocket so the one inch MacWrite margin becomes a zero inch margin on the actual mailing label.

Those of you lucky enough to own an Epson MX-80, FX-100, or JX-80 printer along with an Epson serial interface board (model numbers 8145 or 8148), do not have this problem. A recently released program, EPSTART, version 1.0, from SoftStyle, Inc. makes the Epson compatible with the Mac. EPSTART modifies the Imagewriter driver found in the system folder. Using EPSTART is simple. Merely copy the program onto your startup disk and run it. You will be presented with a dialog box that offers the choice of Epson or Imagewriter. Click on the appropriate choice and modification takes place. According to SoftStyle EPSTART is compatible with all publicly released versions of the Imagewriter system file released prior to July, 1984. SoftStyle does not guarantee compatibility with non-released version of the Imagewriter system files or Epson clone printers like the Gemini series. If you have a different Epson printer than the ones mentioned above, SoftStyle has not forgotten about you. Their next version of EPSTART will support all Epson printers including the LQ-1500. As the only other way to get the Epson printers to work with the Mac is to use a $100 hardware modification. At $39.95, this program represents a considerable saving.

My second complaint, really more of a comment, deals with the public perception of MacWrite, version 2.2. There seems to be almost universal praise for it. Well, I for one do not think it is all that fantastic. Remove the ability to see the different type of fonts on screen and it is no more than a very basic word processor. Consider its limitations. First, it has an outrageously limited file size; the largest document it can hold is approximately 10 pages. Secondly, unless you insert hard page breaks, MacWrite will print to nearly the end of the page. (How I wish for a command to tell MacWrite to print only 50 [or some other number] lines per page.) Finally the header and footer control need a control that will allow the first header or footer to appear on the second page of a business letter or document. With that, MacWrite will be acceptable for business writing.

As a side note, by the time you read this, Apple should have released its new version of MacWrite. This version, tentatively numbered 3.6, will use virtual memory to store files. Only that portion of the file actually used is in memory. That portion not currently being accessed is stored on the disk. This means that your docu-

Continued on page 73

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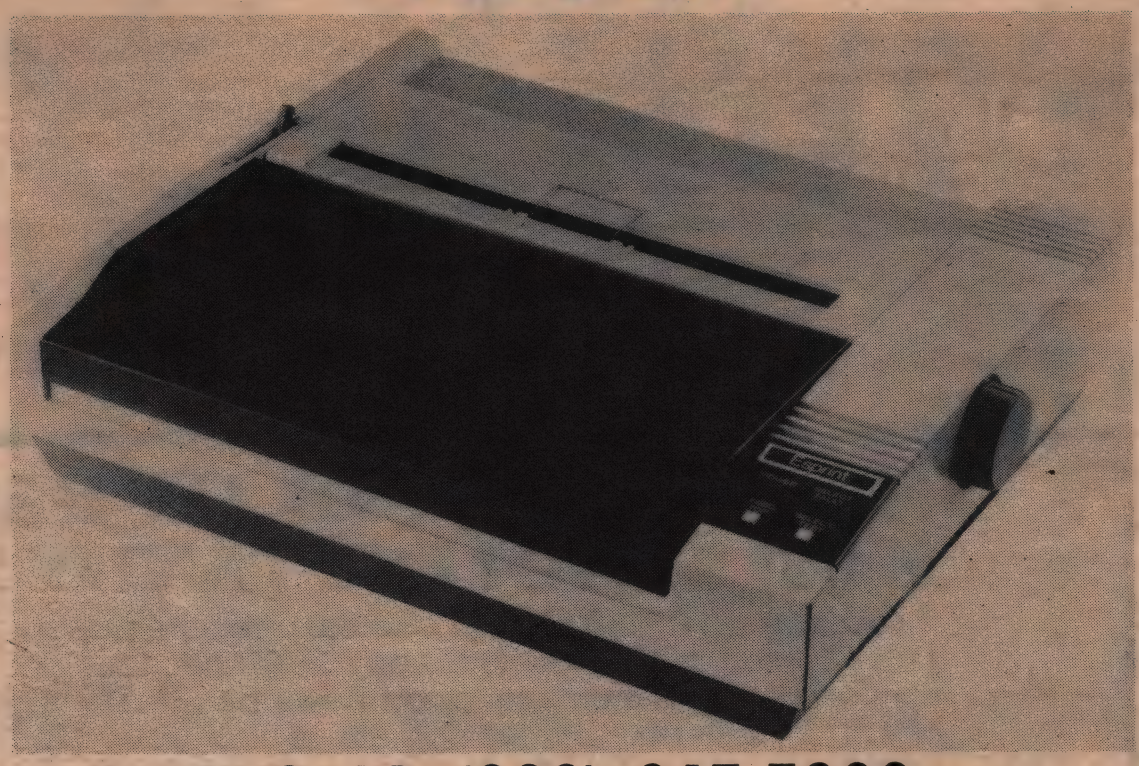

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8088	6 Mhz	CPU		@	13.75

EPROM

27256	250	ns	HITACHI PGM @ 12.5V	32Kx8		$30.87
27128	250	ns	HITACHI	16Kx8		$10.97
27C64	200	ns	HITACHI ,5 MW standby	8Kx8		$11.87
2764	250	ns	HITACHI	8Kx8		$4.97
2732A	250	ns	HITACHI	4Kx8		$5.87
2732	450	ns	HITACHI	4Kx8		$5.40
2716	450	ns	HITACHI	2Kx8		$3.21
2532	450	ns	HITACHI	4Kx8		$4.07

**CAUTION: Do not program the 2732A in a 2732 socket: The suffix A requires 21 v max programming voltage vs the standard 25 v.

STATIC RAM

5565P-15	150	ns	TOSHIBA	8Kx8 NMOS/CMOS	@	$17.67
6264LP-15	150	ns	HITACHI	8Kx8 NMOS/CMOS	@	$18.75
6264P-15	150	ns	HITACHI	8Kx8 NMOS/CMOS	@	$17.67
6116P-3	150	ns	HITACHI	2Kx8 CMOS	@	$3.67

Z80A FAMILY: THE CP/M MACHINE

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Z80A-CTC	4 Mhz ZILOG	COUNTER TIMER CKT	@	$2.65
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Z80B-CPU	6 Mhz SGS	CPU	@	$8.50
Z80A-PIO	4 Mhz ZILOG	PARALLEL INPUT/OUTPUT	@	$2.75
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MacUniverse
Continued from page 73

doing things with Chart you never thought were possible.

The second book, *Silicon Valley Guide to Financial Success in Software* by Robert Dunaway, Daniel Remer and Paul Remer (ISBN 0-914845-09-8), has a suggested retail price of $19.95. Change the title and examples and this book could be about financial success in the cookie business, the magazine business, the clothing business, or any business for that matter. It is nothing more than a book on how to start and run a business. The best that can be said about the book is that it presents the information in a nice, breezy way using a lot of "real life" examples and name dropping. The worse that can be said about it is that it oversimplifies complex legal matters. For example, it says the "Office of Export Administration has adopted regulations that restrict the export of certain computer hardware and software." In reality, if you want to mail 500 copies of Pac-Man or any other similar arcade game to the United Kingdom, you need two export licenses; one for the magnetic media and another for the software (almost all software, except public domain and that printed in computer magazines) is classified as "General Technical Data Restricted." I feel this is the kind of book that is read once and then thrown away. If you really want a good grasp on how to start a business, attend a seminar given by the Small Business Administration or a local university.

For those of you who want to learn how to touch type, your universe master recommends Palantir Software's MacType. It is not cheap ($49.95), but it does have two unique features. First, it can teach you either the QWERTY or DVORAK keyboard. Secondly, it is designed so it can be used in the educational market. Each MacType diskette can hold over 100 students' records. The only thing unacceptable with MacType is that it comes copy protected and the publisher has a general policy of not selling backup copies.

The truly outstanding product of the month is the Desk Accessory Mover by CE Software. This product allows you to permanently remove unneeded desk accessories (e.g. the scrapbook, the alarm clock, note pad, calculator, key caps, control panel, and puzzle) from your Mac disks. If you have a one disk Mac, this program will free up valuable disk space. The Desk Accessory Mover is not for sale by any computer store as it is being distributed on the MacHonor System. You can get your copy by either downloading it from the MAUG SIG database on CompuServe (page PCS-51) or sending a blank diskette and self-addressed, stamped envelope to CE Software. If, and only if, you like the program, are you to pay $15 for it.

Two disk copy programs have come across my desk. These programs will make duplicates of your copy protected master diskettes. Under the law any copies you make must be for your personal use. You may not make a copy to give or sell to a third party while you keep the original. The two programs are MACBAK.BAS and Copy II MAC. MACBAK.BAS is a free BASIC language program available on the DL4 database of CompuServe's MAUG. To utilize MACBAK.BAS you must have

Continued on page 79

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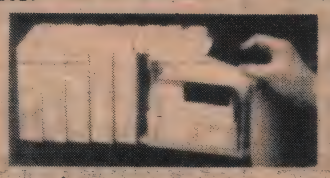

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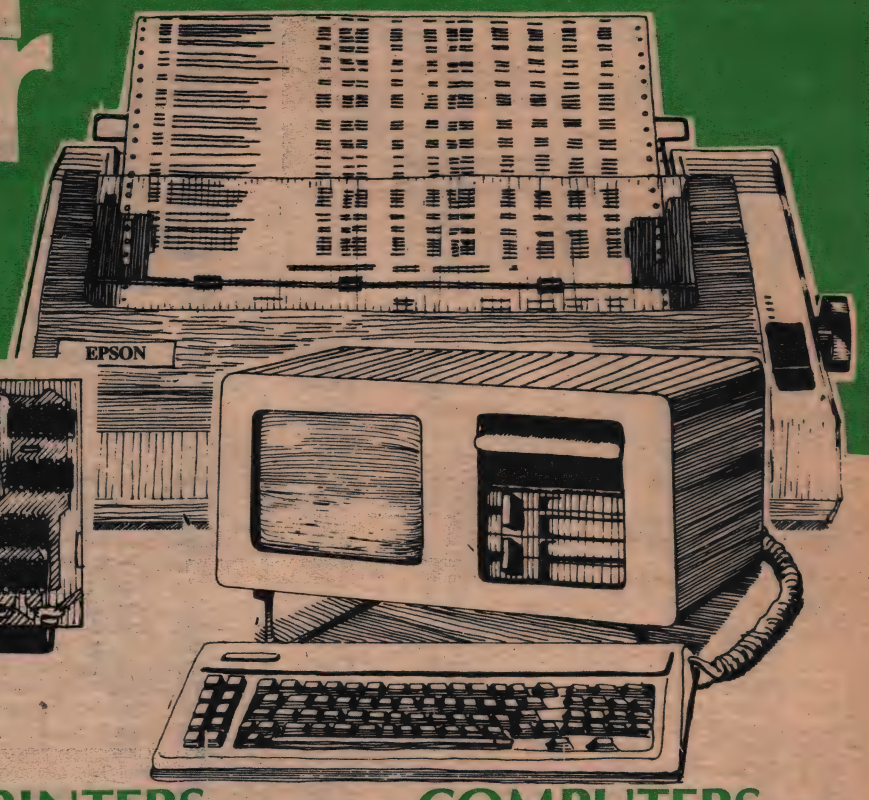

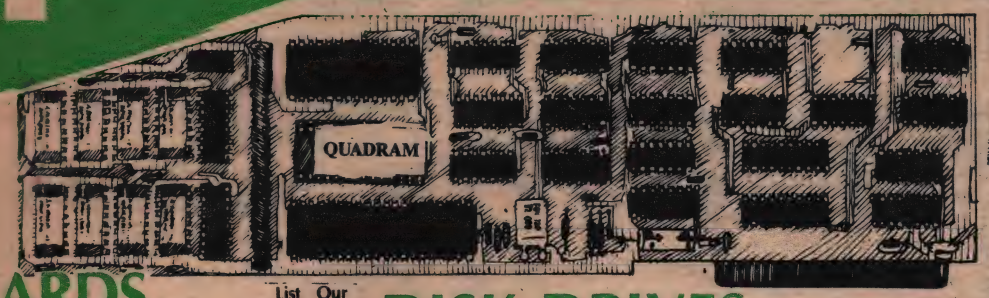

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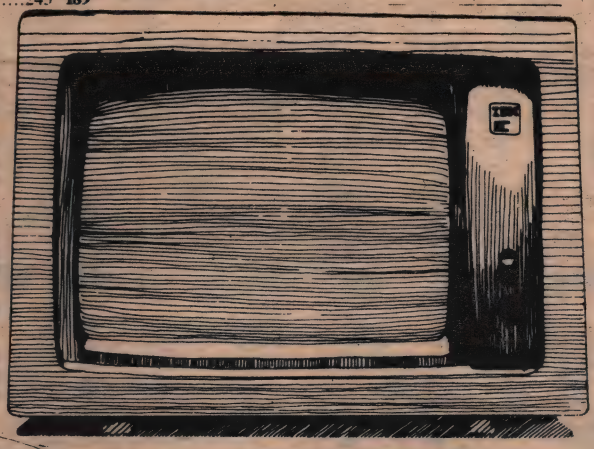

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0273	NEC 8023 Ribbon	10.00	6.65
1469	Net Worth (D)	79.95	55.35
0263	Neutral Zone (D)	34.95	26.00
1756	Nukewar C	15.00	10.40
2703	Odin D	49.95	34.60
1361	Omniwriter/Omnispell (D)	69.95	51.15
2844	Oxford Pascal (D)	50.00	41.70
0821	Paper Clip w/Spell Pak (D)	119.95	83.05
2893	Paral' Printer Ext. Cable 6'	34.95	21.80
1953	Pharoh's Curse D	34.95	24.20
2834	Pinball D	29.95	20.70
2915	Pinball Const. Set D	40.00	30.75
0381	Pitfall II (D)	34.95	26.90
2184	Pitstop R	40.00	27.70
1975	Pitstop 2 (D)	40.00	29.20
2201	Planetfall D	34.95	23.30
2177	Pooyan C/D	29.95	20.70
2983	Powerfile D	89.95	69.20
2820	Practicalc D	55.95	38.0
1344	Racing Destruction Set (D)	35.00	26.95
1392	Raid on Bungeling Bay (D)	29.95	20.75
1297	Raid Over Moscow (D)	39.95	27.65
1348	Realm of Impossiblity (D)	35.00	26.95
2711	Rhymes & Riddles D	29.95	20.75
0503	Riteman Plus Printer	399.00	312.80
2993	Sargon 2 D	34.95	24.20
0221	Scooter Surge Prot Strip-6	48.35	37.20
1473	Scrolls of Abadon (D)	34.95	25.60
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1416	Smith Corona TP1 Ribbon	7.95	6.35
1937	Snooper Troops #1 D	39.95	27.60
2710	Snooper Troops #2 D	39.95	27.65
2837	Software Automouth D	59.95	41.45
2952	Solo Flight D	34.95	26.90
2968	Spider Eater D	29.95	20.80
1790	Spy Hunter (R)	44.95	31.10
2725	Star Battle D	24.95	17.30
2935	Star Trek R	39.95	27.60
1881	Starcross D	39.95	27.65
1277	Starwriter Film Ribbon	5.50	4.50
1278	Starwriter Nylon Ribbon	5.75	4.65
1109	Summer Games (D)	39.95	27.70
1188	Superbase 64 (D)	99.95	76.90
0759	Superclonse w/Unguard (D)	49.95	38.45
2250	Supertext Pro D	99.00	66.00
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0346	Tax Advantage D	69.95	44.85
1259	Taxan 12 in Amber Monitor	189.00	138.65
1258	Taxan 12 in Green Monitor	179.00	131.60
1528	Taxan Color Mntr W/Audio	399.00	305.50
1758	Telegard C	23.00	15.95
0444	Telengard D	28.00	19.40
1836	Temple of Apshai D	40.00	27.70
2874	The Consultant (D)	99.95	69.20
1788	Total Modem	129.95	75.60
0913	Trains (D)	39.95	27.65
1281	Trunk Floppy Storage	29.95	21.50
2195	Turtle Graphics II R	59.95	41.50
0679	Type Tutor/Word Invade D	24.95	17.30
0884	Ultima 3 D	54.95	38.05
0541	Ultrabasic - 64 (D)	27.95	21.50
1837	Upper Reaches Asphai D	20.00	13.85
1721	Verbatim SS/DD Hardpack	35.00	23.35
0093	Verbatim SS/DD Softpack	34.00	18.00
1072	VIP Terminal D	49.95	41.65
0394	Wabash Disks SS/DS (10)	19.95	17.25
1217	Westridge Auto-Dial Modem	109.00	83.35
0002	Wico Joystick	29.95	21.95
0015	Wico Redball Joystick	34.95	24.40
0008	Wico The Boss Joystick	19.95	14.10
1885	Witness D	34.95	23.20
1293	Wizard (D)	39.95	30.75
2889	Wordpro 3+ W/Spell D	99.95	75.00
0264	Worms D	40.00	30.75
2871	Your Commodore 64	14.95	12.50
0577	Zaxxon D	39.95	27.65
1741	Zork I D	39.95	31.25
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0723	Algebra V & VI (2-Disk)	49.95	34.50
1142	Alien Addition (Home)	34.00	23.55
0013	Alpha Plot	39.50	27.25
2598	Alphabet Zoo	29.95	20.70
0434	Apple Cat 2 Modem	319.00	244.95
0151	Apple Mechanic	29.50	20.35
0490	Apple Users Guide 2/2E	17.95	14.50
0309	Applewriter 2 Pre-Boot	24.00	16.95
1446	Back to Basics Acct. 2E	195.00	123.75
0042	Bag of Tricks	39.95	27.65
1685	Bank Street Filer	69.95	48.35
0501	Bank Street Writer	69.95	48.35
1204	Bank St. Writer 2C/E-128K	69.95	48.35
0211	Barron's Computer Sat	89.95	62.30
0277	Battle For Normandy	39.95	27.65
0278	Beagle Bag	29.50	20.35
0126	Beagle Basic	34.95	24.20
1192	Beagle Graphics	59.95	41.50
0658	Beneath Apple DOS	19.95	13.85
1395	Beneath Apple Prodos	19.95	14.95
1136	Beyond Castle Wolfenstein	34.95	24.20
0111	Book of Apple Software '85	24.95	16.00
0096	Bookends	125.00	86.40
1375	BPI General Acct. 2 E	395.00	263.35
2599	Broadsides	39.95	27.70
1682	Buffered Grappler+ (16K)	239.00	178.00
0448	Bumble Games	39.95	27.65
2805	Business Accountant 2/2E	255.00	196.15
0228	Castle Wolfenstein	29.95	20.70
0459	Cat Graphics	34.95	26.65
0734	CDEX How to Use Apple IIE	59.95	41.50
0733	CDEX Visicalc Training	59.95	41.50
1417	Charles Brown's ABC's	39.95	27.65
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0654	Compu-Read	29.95	20.70
0734	Compu-Spell System	29.95	20.70
0416	Compuserve Starter Kit	39.95	24.35
1138	Computer Sat (Harcourt)	79.95	62.85
1731	Copy 2 Plus	39.95	25.65
2910	Cut & Paste	50.00	38.50
1900	D Code	39.95	26.65
1265	DB Master Version 4	350.00	242.35
0052	Deadline	49.95	34.50
0189	Decathalon	29.95	20.70
0630	Delta Drawing	39.95	27.65
1143	Demolition Division (Home)	34.00	23.55
1166	Disk Bank (50)	19.95	11.00
1722	Disk Boxes (5 Color Coded)	25.00	12.50
2866	Disk Drive Ext. Cable	19.75	16.70
2833	Disk Quik	29.50	20.45
1205	Dollars & Sense-2C	119.95	83.05
0409	Dollars & Sense	100.00	69.25
0216	DOS Boss	24.00	16.60
0983	Double Take	34.95	24.15
2600	Eagles	39.95	27.70
0360	Early Games Young Children	29.95	20.75
1384	Echo 2 Speech Synthesizer	149.95	125.60
0661	Elementary Apple	14.95	10.35
0092	Elephant Disks SS/DD (10)	20.55	18.20
1137	Elephant Disks SS/SD (10)	34.00	17.95
0107	Epson Mx-80 Ribbon	14.00	6.30
0029	Essential Data Duplicator	79.95	52.00
0314	EZ Port II	34.95	24.20

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1182	Fat Cat	34.95	24.20
0850	Flashcalc	99.00	68.55
0553	Flex Text	29.50	20.35
2821	Flight Simulator II	49.95	38.05
2918	Flip & File W/Lock (50)	39.95	23.85
1440	Flip-N-File (50 Disks)	19.95	11.30
2796	Fontrix	75.00	64.10
1427	Format II Enhanced	150.00	103.85
0554	Frame-Up	29.50	20.35
1127	Game Show	39.95	27.65
0046	General Manager II	229.95	158.90
0533	Geopolitique 1990	39.95	27.65
0573	Gertrude's Puzzles	44.95	31.15
2843	Global PLE/Beagle Bros.	49.95	34.60
0043	Graphics Magician	59.95	41.40
1530	Grammer Examiner	44.95	31.10
0094	Grappler +	175.00	110.80
2902	Hardhat Mac	35.00	26.95
2816	Hayes Joystick Mach 2	44.95	31.15
2817	Hayes Joystick Mach 2-E	44.95	31.15
2883	Hayes Joystick Mach 3	54.95	38.05
2880	Hayes Joystick Mach 3-E	54.95	38.05
1437	Head Cleaning Kit	29.95	17.30
1346	Hitchhikers Guide To Galaxy	39.95	27.70
0197	Home Accountant	74.95	48.05
1364	Home Accounant 2C/E-128K	74.95	48.05
2804	Home Word	69.95	48.60
1684	Home To Pgrm. In Applesoft	49.95	34.60
1589	In Search Of Amazing Thing	39.95	27.60
0449	Juggles Rainbow	29.95	20.75
1442	Kindercomp	29.95	20.70
0003	Knight Of Diamonds	34.95	24.20
1693	Koala Graph Tablet-Apple	124.95	83.50
2954	Krell Logo	89.95	76.95
2972	Labels - 1" White (1000)	9.95	6.75
2890	Learning Bridge Made Easy	79.95	53.35
1463	Legacy of Llylgamyn	39.95	27.65
0050	Letter Perfect	149.95	103.60
0403	Lisa 2.6	79.95	61.75
0310	List Handler	79.95	53.35
0806	Locksmith 5.0	99.95	71.55
0982	Lode Runner	34.95	24.15
0194	Magic Window 2	150.00	103.85
0192	Master Type	39.95	27.65
0089	Maxell MD1 Disk-SS/DD (10)	46.50	21.55
2901	Memorymaster 2E/64K Exp.	169.00	140.85
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0437	Micro Cookbook	40.00	27.65
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2958	Microline Tractor Feed	65.00	54.00
2802	Micromodem IIE W/Smartcom I	329.00	246.75
1294	Micro-Sci 2C Disk Drive	299.00	248.75
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1135	Minus Mission (Home)	34.00	23.55
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1341	Murder on the Zinderneuf	40.00	30.75
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0423	Nibble's Away II	69.95	53.25
2908	One On One	40.00	30.75
0563	Paddle-Adapple Combo	29.95	26.90
0568	Paper Graphics	49.95	34.60
2893	Paral' Printer Ext. Cable 6'	34.95	21.80
0635	Parallel Interface W/Cable	139.50	62.85
1418	Peanuts Picture Puzzlers	39.95	27.65
0616	Personal Touch	89.00	70.55
0088	PFS Access-2E/2C	70.00	48.50
1413	PFS File IIE	125.00	85.95
1415	PFS Graph IIE	125.00	85.95
1414	PFS Report IIE	125.00	85.95
0372	PFS Solutions/Ledger 2E	20.00	13.85
2809	PFS Write IIE	125.00	85.95
0495	Pie Writer 2.2 (40/80)	149.95	103.85
2907	Pinball Const. Set. (E.A.)	40.00	30.75
0659	Power of Visicalc	14.95	10.35
0584	Preschool IQ Builder 1	23.95	16.60
1196	Printshop	49.95	34.60
0349	Pro Blackjack — K. Uston	69.95	48.45
0461	Pronto DOS	29.95	20.35
1279	Prowriter Nylon Ribbon	10.00	6.65
0047	Quest	34.95	24.20
2111	Ramcard 16K (MPC)	99.00	60.25
0634	Ramcard 16K Microtek	129.00	71.55
1386	Ramcard 16K Wizard	95.00	62.85
0140	Ramcard 16K-Microsoft	99.95	75.00
0771	RF Modulator-Internal	39.00	19.40
1450	Rhymes & Riddles	29.95	20.70
0503	Riteman Plus Printer	399.00	312.80
0574	Rocky's Boots	49.95	34.60
0561	Sat Word Attack Skills	49.00	33.90
0133	Screenwriter II	129.95	89.00
0041	Sensible Speller IV	125.00	86.50

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0631	Spelling Bee Games	39.95	27.70
2906	Standing Stones	40.00	30.75
1277	Starwriter Film Ribbon	5.50	4.50
0435	Step-By-Step	99.95	69.20
1447	Step-By-Step II	99.95	69.20
0100	Sticky Bear A B C	39.95	27.65
0099	Sticky Bear Numbers	39.95	27.65
0292	Story Machine	34.95	24.20
1326	Sundog	40.00	30.75
1374	Sup'r Mod — Universal	69.95	53.05
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1259	Taxan 12 in Amber Monitor	189.00	138.65
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1528	Taxan Color Mntr. W/Audio	399.00	305.50
0236	Terrapin Logo	99.95	69.20
0137	TG Game Paddles	39.95	27.65
0136	TG Joystick W/Toggle	59.95	41.50
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1730	The Accountant	99.00	64.10
2597	The Accountant — V Calc. Infc.	20.00	15.40
0844	Think Tank/E	150.00	103.85
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2899	Time Master II	129.00	107.50
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1193	Triple Dump	39.95	27.65
0544	Typefaces	20.00	13.85
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1237	Typing Tutor 3	49.95	34.60
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0093	Verbatim SS/DD Softpack	34.00	18.00
0063	Versaform	389.00	263.00
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2900	Viewmaster 80 Column	169.00	140.80
2152	Visible Computer-6502	49.95	32.70
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1480	Wico Analog-Joystick	49.95	38.40
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0284	Word Handlers Pkg.	169.95	117.65
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2658	Alligator Mix	34.00	23.55
0696	Amdek 300A 12in Amber Mon	199.00	161.50
0104	Amdek 300G 12in Green	179.00	143.40
0272	Amdex Color III Monitor	479.00	383.25
1977	Ancient Art of War	44.95	32.85
1802	ASC II Express Pro	189.95	131.50
0190	AST Comboplus 64K	395.00	296.55
0079	AST Megaplus 64K	395.00	296.55
0594	AST Sixpac Plus 64K	395.00	296.55
0918	ATI-Lotus 1-2-3 (PC XT)	75.00	51.90
0924	ATI-Supercalc	75.00	51.90
0925	ATI-Visicalc (PC XT)	75.00	51.90
0919	ATI-Wordstar Vols 1&2	75.00	51.90
2352	B-1 Nuclear Bomber	21.00	14.55
1281	Back to Basics Acct. 54S	295.00	187.25
1281	Back to Basics Acct.	295.00	187.25
0952	Bank Street Writer	79.95	55.35
0946	Barron's Study for the SAT	89.95	62.30
1512	BASF Disks SS/DD (10)	35.00	19.00
2546	Basic Compiler	395.00	273.50
2480	Battle For Normandy	39.95	27.70
2807	Book of IBM Software	19.95	12.80
2813	BPI Accounts Payable	595.00	411.95
2814	BPI Accounts Receivable	595.00	411.95
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2370	CDEX Training for Visicalc	69.95	48.45
0971	CDEX Training-PC DOS 2.0	69.95	48.40
0959	CDEX Training-Supercalc	69.95	48.40
0932	Centipede	34.95	29.10
1019	Chess	69.95	48.40
2775	Computer Baseball	39.95	27.65
2385	Computer Football	21.00	14.55
0433	Copy 2PC	39.95	25.65
2515	CP/M 86	60.00	41.55
2395	Creature Creator	39.95	27.70
2458	Crisis Mountain	35.00	24.25
2553	Crosstalk XVI	195.00	135.00
1043	Dark Crystal Adv #6	37.95	26.25
2571	Data Capture	120.00	83.10
2988	Database Manager II	295.00	204.25
2636	DB Master	595.00	411.95
2344	Deadline	49.95	34.60
2456	Death in the Caribbean	35.00	24.25
0934	Defender	34.95	29.10
2773	Delta Drawing	49.95	34.60
2659	Demolition Division	34.00	23.55
0935	Dig Dug	34.95	29.10
1722	Disk Boxes (5 Color Coded)	25.00	12.50
2554	Dollars & $ense	165.00	114.25
1465	Dollars & Sense M/Forecast	179.95	124.60
0937	Donkey Kong	34.95	29.10
2405	DR Logo (CP/M 86)	149.95	103.85
2357	Draw Poker	21.00	14.55
0874	Dust Cover-PC Keyboard	7.99	5.30
2746	Early Games Children	29.95	20.75
2747	Early Games Matchmaker	29.95	20.75
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Ask The Guru

by Don Lancaster

Ask the Guru (column one)

Welcome to a brand new Computer Shopper feature column. I'll do what I can here to find answers to reader hardware, software, or supply problems. Just give me a call or write per the address in the end box. Best calling times are 8-5 weekdays, mountain standard time. I'll send a free booklist and a special goodies list to you when you respond.

What is the word on ProDOS Applewriter 2.0?

There is a brand new upgrade of *Applewriter* out. It runs under the ProDOS operating system, and has bunches of new features. These include faster operation, better compatibility with other ProDOS programs, easy hard disk access, a built-in send and receive modem, settable screen margins for "what you see is what you get," spreadsheet editing to 240 columns, an optional page/position display, and many other improvements and performance upgrades.

Best of all, the new version is unlocked, unprotected, and freely copyable for any number of backups. Even the source code is capturable.

What's wrong with it? Very little. A few parallel printer cards will not work properly on first try, notably the *Grappler* and the *Pkaso*. See the next question for a free patch. The NULL patch for Epson superscripts is no longer needed, since a [ ] can be substituted. The "shortline" problem remains, but you can write me for a separate free patch on this.

I've been able to personally add full microjustify and proportional space, author's keyword indexing, multiple columns, HIRES dumps, unique self-prompting glossaries, code extensions, and many other goodies to it.

Cost of the latest ProDOS 2.0 version is $150 from your local Apple dealer. There is a $50 upgrade service if you send in any older Applewriter first factory disk and a manual cover to *Applewriter Upgrade*. Apparently, this price even applies to old, old Applewriter 1.0 or 1.1. The upgrade is a fantastic bargain.

How can I use my Grappler card with ProDOS Applewriter 2.0?

Some parallel printer cards may do very bizarre things to *ProDOS Applewriter 2.0* output. The usual *Grappler* symptom is a burst of 20 spaces every 240 characters. The cause is the grappler card thinking it is intelligent, and then thoroughly rearranging

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MacUniverse
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Microsoft BASIC (version 1.1) and an external disk drive. It does a sector by sector copying. It can copy some but not all protected software. For example, it will copy MultiPlan and ThinkTank 128 but not copy MacPascal or Filevision. For those of you who want a more powerful duplicator try Copy II Mac by Central Point Software. For $39.95 you get a program that (1) makes bit copy, (2) can make files invisible or visible, and (3) locks or unlocks files. Copy II Mac appears to be able to copy anything and everything.

Another free program you should get off MAUG is BINHEX.HEX, located in DL4. It is a program used to convert text versions of binary application programs back to usable applications. For example, you can use it to download and upload MacPaint artwork, user created MacWrite fonts, the Desk Accessory Mover (mentioned above), and the like. To get BINHEX.HEX you must first download the file BINHEX.V30. This program, written in BASIC, needs MicroSoft Basic, version 1.1 to run. It does the same thing that BINHEX.HEX does only much slower. After BINHEX.V30 is downloaded and working, use it to download BINHEX.HEX. Use BINHEX.V30 to convert BINHEX.HEX to a file called BINHEX.TEM. Then use BINHEX.TEM to convert BINHEX.HEX into BINHEX. Once this is done, you are home free.

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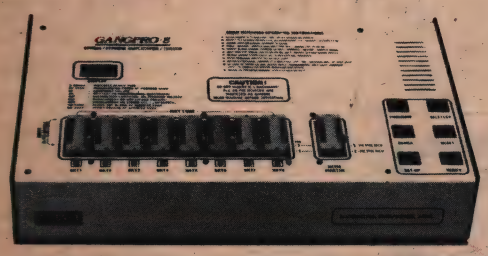

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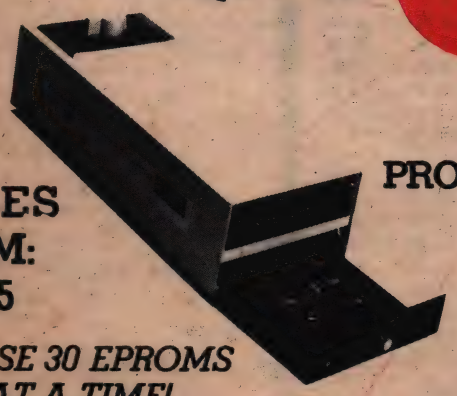

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Kman
Continued from page 90

often found in PC database programs. Most users may not need this amount of security, but for those who do, these features of Kman could by themselves justify its use in preference to other systems.

Performance

Performance in a database program is a difficult question to address. A year ago, Kman performance was more than acceptable especially when compared to other programs. Since that time, there have been regular improvements in performance with each new release. Typical of Kman's overall design orientation towards performance is their use of the B + tree structure for index files. This trend can easily be expected to continue.

One indication of Kman's performance orientation can be seen in its tailoring facilities. We already spoke of the environmental variables which can have noticeable impact on performance. In addition, Kman itself can be tailored. For example, if you need floating point math, the FLOAT.EXE subroutines can be used; if not needed, they do not have to take up memory space. If you have more than the minimum 192k of RAM, you can build a tailored Kman load module which will include heavily used segments of the Kman overlay files. The user specifies what files are to be made resident according to individual usage patterns.

At this point, the only major performance increase that could be made in Kman would be to provide support for the 8087 math coprocessor. Considering the exceptional richness of Kman's math functions, it is a surprise that this support has not yet been provided.

The Query Language

Overall, the Kman query language is most similar to the SQL/DS relational language found on IBM mainframe systems. As such, it is an extremely powerful and flexible language. On top of this, Kman provides an extremely rich set of functions for manipulating data. The math functions include SIN, ARCSIN, LOG, LN, EXP, and SQRT among others. A highly unusual feature is the ROOT command which determines the roots of a polynomial expression within a specified range and to a desired degree of accuracy. This is useful for calculating internal rates of return as well as for engineering calculations. The set is sufficient for most scientific and business modeling requirements. A macro facility is also provided which allows the one time definition of functions, such as COS and TAN, using the existing math functions.

Kman also has one of the most extensive string handling facilities I have seen in a PC database program. Functions are provided for wildcard pattern matching within strings, substring extraction, conversion between string and numeric forms, converting to upper or lower case, and more. A function is also provided which determines if a particular field is of string, numeric, or logical type. There are high level programming languages in common use which do not provide this level of string handling facilities. Because of Kman's strength in this area, I know of at least one developer who is considering using it as the base for a bibliographic search facility.

Kman also provides facilities for importing and exporting data with non-Kman files. ATTACH will import data from quoted ASCII files into Kman tables. The rules for how various data types are treated are quite flexible and will fit most cases. The CONVERT command can produce output files in one-value-per-line ASCII, quoted or unquoted ASCII strings, or DIF format. Although these facilities are useful for most applications, a more general IMPORT/EXPORT function which could handle binary integer and floating point formats in both directions would be a significant enhancement. Since Kman does a better job in this area than most integrated software and database programs, this should not be considered a heavy criticism. However, with these facilities, Kman databases could truly be used as the central repository for most of a user's data.

Predefined Queries

Like most database languages, Kman allows you to

Continued on page 93

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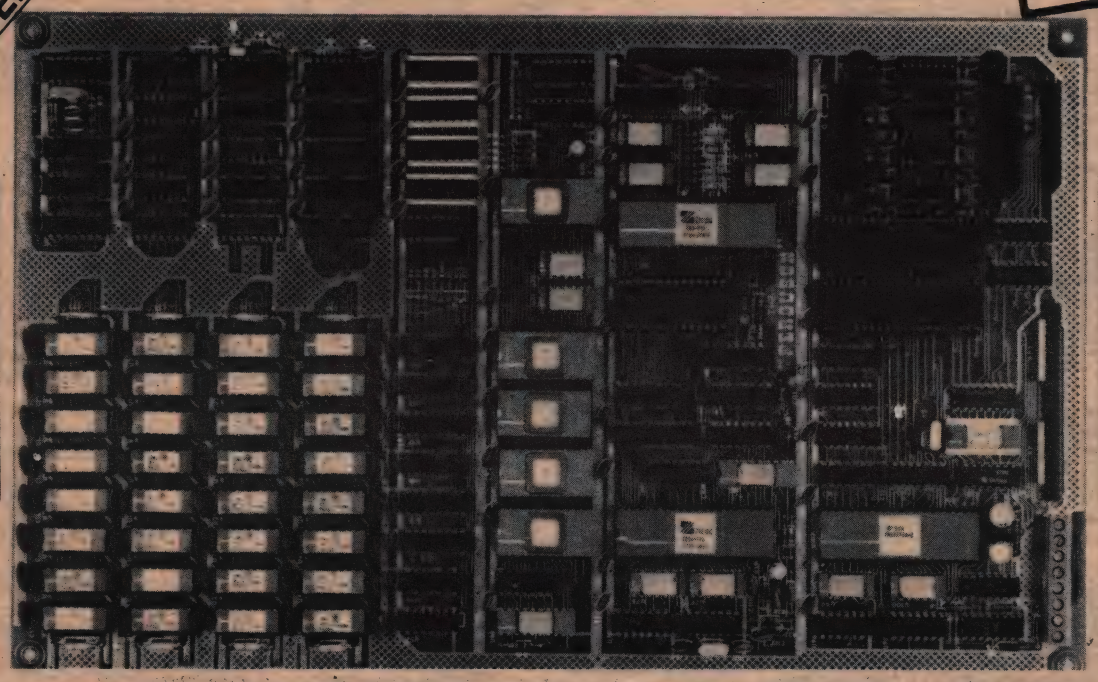

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Kman
Continued from page 92

predefine a series of commands to execute commonly used queries. However, Kman provides two methods of doing this. The macro facility, mentioned earlier, allows queries based on predetermined variables which are set before the macro is executed. This capability is common to most database programs. As usual, Kman takes it one step further with the PERFORM capability. This allows the definition of a procedure which operates much like a subroutine in high level languages. Each time the procedure is PERFORM'd, it can use a different set of variables, ie., A, B, and C one time and Q, X, and Z the next. This allows for the development of more generally useful procedures which can be shared among a number of application programs. Kman also allows variable names to be declared as local within a procedure to eliminate conflict with variable names in the calling program. This is a safety feature commonly found in the newer programming languages, but not often found in PC database programs.

Like most database programs, Kman also provides a forms oriented approach to displaying data on the screen and retrieving field oriented user input. Unlike other programs, Kman also provides an extra cost component, K-Paint, which aids in the design of these screen forms. True, there are screen design programs for other database systems, but these often come from vendors other than the one who designed the database system. If changes are made to the database program, it may take some time before the screen design programs catch up with the changes. In the case of K-Paint, any update to Kman which affects its operation is modified in the corresponding update to K-Paint.

K-Paint itself is very easy to use. It actually appears as a full screen editor and allows fields to be easily moved around the screen. Fields may be added, deleted and modified. Color attributes and editing masks can be defined. And the database field to be associated with each screen field can be specified. With K-Paint, it is possible to define in minutes complex screens which would take hours to define with more traditional methods. Modification of existing screens to meet new application requirements is even easier. If you do much predefined query work, this option is certainly worth the extra money.

The Spreadsheet

Kman was the first product to combine a spreadsheet view of data with a full database capability. Although Lotus 1-2-3 did provide primitive database functions, it was not easily usable for more than very simple queries. Also, the size of the database was limited by the requirement for memory residence of both the data and the associated spreadsheet. Framework now provides access to dBASE III but still with significant memory limitations and additional cost.

The Kman spreadsheet seems limited to 256 rows and 256 columns, but this is not as much a problem as it might seem. Unlike most spreadsheets, Kman allows tables (such as quantity versus discount rated) to be separately defined and referred to within spreadsheet cells. The cells themselves are extremely powerful. The richness of the available functions was mentioned previously. But a Kman spreadsheet cell can also contain database access commands and, in fact, a single cell can represent an entire database program. While working within the spreadsheet, you can also exit to database query mode, perform any number of operations and return to spreadsheet mode without losing any of the spreadsheet data.

Users who are more comfortable defining their problems in spreadsheet terms will find this a very powerful and useful facility. It comes with the base Kman product at no additional cost.

Mouse Support

Kman provides support for the Microsoft mouse, or equivalent, as an extra cost option. The mouse can be automatically used for cursor positioning, cell selection, and similar operations within Kman itself. Once again, Kman goes the extra step and makes mouse access and control available to the user within his own procedures. Fourteen functions are provided which allow the user to modify mouse control parameters, set mouse and cursor positions, inquire for mouse status information,

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* Fully supports IEEE 696 24 BIT Extended Addressing.
* 64K draws only approximately 500 MA.
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* SUPPORTS PHANTOM (BOTH LOWER 32K AND ENTIRE BOARD).
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Kman

Continued from page 93

and enable or disable mouse processing.

We have tested this support with both the Mouse Systems and the Microsoft mice and it works as advertised. For those who like working with mice, this is a useful extra cost option.

Business Graphics

Like most Kman facilities, the extra cost K-Graph business graphing package is extremely rich. Bar, Stacked Bar, Clustered Bar, Sorted Bar, Area, Percent Area, Sorted Area, Pie and Percent Pie with or without offset, Scatter, Line, Function, and Hi-Lo-Close graphs may be plotted. Various types of graphs can be overlayed on a single screen. Full control of scaling, legends, line style, color, and text within the graph is allowed.

Each graph type is unlimited in the number of points or variables it can plot. If you need a plot of 15 lines, you can get it. The only restriction is visibility on the screen. Once a graph has been generated, it can be named and saved for later recall by name. This can be handy while you are generating a complex graph. It is also useful when you want to include graphs in a text document.

K-Graph also provides a facility to draw free form figures. Unfortunately, this feature uses a point and connection list to specify the figure. This is usable for simple figures but could rapidly become difficult for complex figures. Also, no closed area color fill capability is provided. It would be nice to see these areas improved in future releases although they are not critical needs.

K-Graph currently supports the IBM color graphics board, the IBM, Epson compatible, and Mannesman-Talley printers, and the HP-7475a plotter for graphic output. With the current state of the art, this is reasonable. However, once IBM releases the GKS Kernel graphics facilities, it would be a big plus for Kman to switch over to GKS for graphics. The additional device support, especially for devices such as the Polaroid Palette camera, would make this an even more attractive product. Although at $225, it beats products costing twice as much.

Text Processing

As if all this were not enough, Kman just recently released the K-Text text processing option. I have been waiting for this one for a long time but would have been satisfied with a simple full screen editor for developing Kman procedures. But as usual, that was not enough for Kman. What they finally released was a full function text processor with the capability to include the results of database queries, spreadsheet operations, and graphics output within the document.

K-Text is not an onscreen "what you see is what you get" type text editor. Instead, it uses imbedded commands, much like PC/Script and The Final Word, to specify document formatting operations. More than forty commands are provided which specify parameters such as page size, tab settings, margins, headers and footers, Arabic or Roman page numbering, and so on. Conditional page breaks are also provided so you can be sure there is enough room on a page for a graph or figure before starting to print it.

Perhaps the most interesting of these commands is the ".ev", or "evaluate", command. This allows you to imbed Kman commands within your document. These commands are evaluated at the time the document is printed and any printer output resulting from these commands is included in the document at that point.

As part of this feature, a very powerful "mail merge" feature emerges. Multiple copies of a form letter can be modified and printed based on the contents of a list file. The criteria for selection of members from that list file (such as accounts due over 90 days) can be specified in the command that causes the documents to be printed.

But K-Text must be considered a text processor rather than a document processor. Multiple heading styles, footnotes, index and table of contents generation, and similar facilities are not supported. However, considering the $175 additional cost of this feature, it is well worth it.

Overall

If you get the idea that I am impressed with KnowledgeMan, you have read this review correctly. Like most maturing products, it has some quirks and deficiencies. Some have been noted earlier and are mostly annoyances. One borders on serious. It is possible to improperly (by innocence) use certain commands in a way that exceeds the memory capability of the system. In most such cases, the error is caught. But occasionally the system just goes off into limbo and a break out of Kman

Continued on page 96

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Kman

Continued from page 94

or a system reset is necessary to recover. I have yet to lose a database due to one of these infrequent errors, but these types of errors should be eliminated as soon as possible.

As I said in the beginning, I have been working with various versions of KnowledgeMan for over a year. Based on that experience and the recent release of K-Text, I have pretty much stopped looking at other database and integrated systems. The cost when all the features are added up is somewhat steep, but the quality of the product justifies the additional cost. With better Import/Export facilities and GKS graphics support, the product would be almost unbeatable.

If nothing else, MDBS should be given credit for setting a functional and quality standard with KnowledgeMan that other software developers would do well to try and emulate.

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Hard Disk Backup Protection

by Andrew M. Fried

The Dilemma

During the past two years the acceptance and use of hard disks in microcomputers has increased dramatically and with good reason. A standard 10 megabyte hard disk can hold the equivalent of approximately 30 full diskettes. A hard disk that can locate the information and move it 10 times faster than a floppy is now priced well under $1000. These advantages make the hard disk almost a necessity for business related applications such as large database management programs, software development and general ledger programs.

One problem plaguing the hard disk user is the routine backup of the hard disk. In some situations, the hard disk contains hundreds or thousands of individual files. While PC-DOS does contain file backup and recovery programs, this is time consuming and requires the constant insertion of diskettes.

Andy Fried uses two tape streamers to back up his PC and writes a thorough evaluation of each of them. Read about the good and not so good points of each type of streamer.

Streaming tape technology brings the hard disk user a viable alternative to the floppy disk shuffle. For the backup procedure it usually requires only one tape cartridge and anywhere from four to forty-five minutes to make a backup of the entire hard disk. Furthermore, it isn't as labor intensive. A user can start the process, go do something else, and return after the backup has been completed.

I initially set out to do a review of one particular streaming tape system called the Sysgen Image. Several days after receiving the Sysgen Image for a review, Mark Reicheg from Floppy Disk Services called me and asked if I would be interested in evaluating the Irwin 110 streaming tape unit. We decided to evaluate both the Sysgen and the Irwin.

What's A Streamer?

Streaming tape backup units consist of four main components: 1) the tape cartridge, 2) the mechanical tape mechanism, 3) the software drivers and 4) the interface. The first component is the tape cartridge. While the actual configuration of this unit varies

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Hard Disk
Continued from page 96

from manufacturer to manufacturer, they are little more than a cartridge containing several hundred feet of magnetic tape and costing from $20 to $50. Sysgen uses a cartridge that looks identical to a standard cassette tape whereas Irwin uses a special 3M data cartridge designed especially for computer applications.

The second main unit is the tape mechanism itself. This unit accepts the tape and performs all the necessary reading, writing and rewinding of the tape much like the way disk drives handle a diskette. Some manufacturers house the units in their own enclosures external to the computer; others have options to mount them inside the computer. Some manufacturers offer complete storage subsystems containing the hard disk, power supply, and streaming tape backup unit all packaged in one neat little enclosure.

The third component is the interface. This, like the driver software, varies from unit to unit. Much like floppy disks, all streamers require electronic circuits; some systems utilize boards that plug into the PCs motherboard (require one slot) and others are self-contained. This should be considered when shopping for a streaming tape backup system. If you have no available slots remaining in your computer, you must look for a self-contained unit. If your office has several PCs, you might want to share one streamer among all of your machines. In this situation, you would definitely want a totally self-contained unit requiring only an external connection to the computer.

Finally, all streaming tape systems require some form of software in order to operate. Since DOS contains no provisions for this type of device, each manufacturer must create its own driver software. This software is the single most important feature of the streamer; bugs in the software could render the backups useless. Furthermore, this software determines the flexibility and power of the streamer. When shopping for streamers, evaluations of the driver software cannot be overemphasized.

Advantages of Streamer Tape Backups

One unfortunate thing about hard disks is that when they go, they go 'big time.' We've all heard the horror stories about the operator who ran FORMAT instead of CHKDSK, or that new applications program that went haywire and overwrote the directory. How about the silent killer, the ERASE *.* (when logged into the wrong directory). Let's not forget an actual hardware failure such as a head crash, either.

The bottom line is that the bigger the disk gets, the more we rely on them and the more disastrous data losses become. Data loss can occur anytime for any reason. For these reasons, a simple, effective and efficient backup method is needed.

Streaming tape units have become the most popular and preferred method for backing up hard disks for several reasons. To begin with, the units are relatively inexpensive. My testing involves the Sysgen unit which retails for $995 and the Irwin unit which is currently being sold by Floppy Disk Services for $395. Of equal importance is that the tapes themselves are also inexpensive ($20-$25 for both the Sysgen tapes as well as the Irwin cartridges).

Streamers are relatively fast, usually backing up a 10 megabyte hard disk in five to twenty-five minutes. Furthermore, they require little or no intervention during the backup process.

Streamers are extremely easy to operate and often have very powerful utilities allowing flexibility in providing different types of backup. Almost all streamers allow the saving of selected files in addition to backing up the entire hard disk (referred to as an image save). This could be an important feature should you wish to backup a single 3,750,000 byte database and transport it to another machine. Using a file save, you could easily accomplish this.

Disadvantages of Streamers

There are two things to remember about streaming tape units. First of all, if you do an image backup of your hard disk, you usually cannot retrieve individual files from the streamer and copy them onto your hard disk. Image saves require image backups.

The software drivers become very important when considering the second possible disadvantage. Under PC-DOS, when you format a hard disk, bad sectors are written off and never again used. Since most hard disks have one or more bad sectors, this is an important safeguard since any data

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8" SSSD Shugart Compatible, 32 Hard Sector	———	———	F31A-Y	1.79	———	———	———	———
8" SSDD IBM Compatible (128 B/S, 26 Sectors)	———	———	F13I-Y	1.89	———	———	8SSDD-Y	2.39
8" DSDD Soft Sector (Unformated)	———	———	F14A-Y	2.09	———	———	8DSDD-Y	2.89
8" DSDD Soft Sector (256 B/S, 26 Sectors)	———	———	F144-Y	2.09	———	———	———	———
8" DSDD Soft Sector (512 B/S, 15 Sectors)	———	———	F145-Y	2.09	———	———	———	———
8" DSDD Soft Sector (1024 B/S, 8 Sectors)	———	———	F147-Y	2.09	———	———	8DSDD-1024-Y	2.89
5¼" SSSD Soft Sector w/Hub Ring	6431-Y	1.04	M11A-Y	1.09	———	———	———	———
5¼" SSSD Same as above but bulk product	6437-Y	0.84	M11AB-Y	0.89	———	———	———	———
5¼" SSSD 10 Hard Sector w/Hub Ring	———	———	M41A-Y	1.09	———	———	———	———
5¼" SSDD Soft Sector w/Hub Ring	6481-Y	1.19	M13A-Y	1.24	54974-Y	1.34	5SSDD-RH-Y	1.49
5¼" SSDD Same as above, but bulk product	6487-Y	0.99	M13AB-Y	1.04	———	———	———	———
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5¼" DSDD Soft Sector w/Hub Ring	6491-Y	1.34	M14A-Y	1.49	54980-Y	1.54	5DSDD-RH-Y	1.99
5¼" DSDD Same as above, but bulk product	6497-Y	1.14	M14AB-Y	1.29	———	———	———	———
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5¼" DSDD 16 Hard Sector w/Hub Ring	———	———	M54A-Y	1.49	———	———	———	———
5¼" DSDD Soft Sector 96 Tracks per inch	6501-Y	2.14	M16A-Y	2.49	———	———	5DSDD-96RH-Y	2.79
5¼" DS High Density Soft Sector for IBM PC AT	———	———	M18A-Y	3.99	———	———	5DSHD-96-Y	4.99
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Hard Disk
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inadvertently written to a bad sector would be lost forever.

When you perform image saves onto a streaming tape backup unit, the hard disk is copied bit-by-bit onto the tape along with a memory map of the bad sectors that the streamer bypassed. Should you do an image restore to the hard disk, it replaces everything in exactly the same place it found it.

But what happens if your hard disk crashes and is subsequently replaced? Well, we now have a minor problem: the new disk probably has bad sectors where the original disk did not, and inversely, the replacement disk probably has good sectors where the original one didn't.

If you were to do an image save onto this new disk, you would lose data that is written to the bad sectors on the new disk and wouldn't use the good sectors on the new disk that had corresponded to the bad disk's bad sectors.

Fortunately, most streaming tape backup units have provisions in their software to take care of this situation. But I did want to emphasize just how important the software is that comes packaged with the units.

The Sysgen Image

The Sysgen Image consists of a card requiring one slot on the motherboard, an external tape mechanism, a diskette containing the driver software, loose notebook pages designed to be inserted inside your DOS manual and all cables needed for installation.

The Image is capable of supporting up to 11 megs on the cassette-like tape cartridge. If you have more than 11 megs, you will have to move up to the Quick-File model which supports up to 45 megs.

The support software consists of a ISAVE, the program used to make an image save of your hard disk, FSAVE, used to backup individual files or groups of files, CHECKOUT, a diagnostic problem used to detect DMA problems and IMAGE.SYS, a device driver which must be included in your CONFIG.SYS file.

The Image is boringly simple to operate. Stick the cartridge in, tell it to save the disk, and in four minutes thirty seconds it's done.

The real beauty of the Image is, of course, its speed. There are trade-offs for this speed, however. To begin with, Image requires a slot for a large board resembling the hard disk controller card. This is a severe problem for those that expanded a PC into an XT using the original 63 watt power supply as the computer must power not only the card but the drive mechanism as well.

It would have been nice if the unit were totally external (including power supply) and merely needed a slot to tie into the bus. This would solve not only the problem of power consumption but would correct yet another drawback—portability. Ideally, a piece of equipment such as this should only have to be purchased once. If you have several XTs in the office, a portable unit that could be carried from machine to machine would be the most economical even though the unit itself costs twice that of its non-portable counterpart.

The Sysgen Software

ISAVE is the program used to make entire disk backups onto the cassette. It's simple to operate. You merely call up the program and tell it that you wish to Backup (go from computer to tape), Restore (go from tape back to computer) or Catalog (a listing of all the images stored on the tape).

Using ISAVE is an all or nothing proposition; you must either backup or restore the hard disk in its entirety. In other words, if you were to perform an image save of the hard disk and subsequently had to perform a hard disk restore, you would have to do it as an image; files cannot be individually accessed.

FSAVE, on the other hand, is designed to backup or restore specific file(s). This is useful in saving large databases, entire directories or specific files. This command is somewhat more complex than the ISAVE command as you can specify several parameters associated with the file saves. For instance, you can save all files modified since the last save, include or exclude hidden and system files, include all files in the current directory as well as those in its subdirectories, save all files from a certain date or identify groups of files by filespec.

Because of the vast number of combinations, you can opt to leave a menu-like command mode and directly enter the commands on one single line. This saves time and speeds through the already fast backup.

I decided to try to save my entire disk by files (even though I have well over the 512 file limit). I discovered that the

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Hard Disk
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cassette seemed to fill up after only 5 megs or so. It appears that there is a great deal of overhead when trying to save files as opposed to saving an image.

A Chat with Sysgen

According to Sysgen, approximately 10,000 Images have been sold to date. That, combined with their new release of the Quick-File, certainly makes them one of the industry leaders in streaming tape technology. The Quick-File units boast a capacity of 45 megs and carries a suggested retail of $1395 for an internal and $1495 for the external version; the Image retails at $995.

Sysgen advised me that the Image had been tested for use in the following compatibles: Compaq, Columbia, Leading Edge, Sperry, and Televideo. Service is available directly from the factory or through the nationwide TRW network.

The Irwin Unit

The Irwin 110 streamer is a self-contained half height unit which uses the floppy disk controller card for its interface. If using a one drive system (such as an XT), the unit can be attached to the disk cable using the other plug (already provided on the IBM cable) just as though it were a floppy. If mounted externally or if the system has two floppy disks installed, the unit is connected to the external connector on the floppy disk controller. This feature alone enables the Irwin to sell for less than half what the others do.

In case you haven't heard of Irwin, they are the manufacturer of the streaming tape units recently used by Compaq for their Deskpro computers.

Since the Irwin is sold strictly to OEMs, units available at the retail level are usually sold on a 'value added' basis—meaning that the retail outlet produced interface cables, enclosures or in some other way enhanced the base unit. The unit I received from Floppy Disk Services was installed in an enclosure with the logic cable, mounting brackets, the data cartridge and a diskette containing the programs and diagnostics (the software was written by Irwin themselves).

Installation of the Irwin is somewhat flexible because it doesn't require connection to the bus on the motherboard; most find it's easiest to connect it to the rear of the floppy disk controller even if they have to reroute the cable back inside the case.

If you do consider the Irwin, make sure you get all of the equipment needed to properly install the unit. For an external unit, you'll need an enclosure with power supply, the proper logic cable, and a data cartridge. Internal mountings require a logic cable (if your system has only one drive, this may be omitted), one power plug identical to the floppy cord (most use a Y adapter to split the power cable), and some kind of mounting brackets (good luck with this one!). Since the Irwin has a half height faceplate, make sure you have something to cover the space above the unit as it is installed by itself.

The Irwin Software

Irwin decided to place all of their documentation right on their utilities diskette; each file has a corresponding doc file which can be printed out or viewed using the DOS. The files contained on the disk are as follows:

TFORMAT.COM

Used to servo and format the cartridge. This is only done the first time the cartridge is used. TFORMAT.DOC explains its operation.

IMAGE.COM

This file makes the hard disk image backup. It will perform a 10 meg backup to a new hard disk having different bad sectors from the original one. The IMAGE.DOC file explains the operation of this program.

FIP.COM

This program makes individual file backups which allows you to restore the files individually. FIP.DOC is the doc file for this program.

EXTAPE.COM

This is the diagnostic program that seems too good to be true. It allows you to move the tape, read individual locations on the tape, check different status conditions, rewind the tape, and many other things. Kind of like a Norton Utilities for the streamer. EXTAPE.DOC explains a little about the program; too little for my likes. Irwin needs to rewrite this doc file in much greater detail in order to enable people to take full advantage of the diagnostics.

There are several other miscellaneous files on the disk, but they deal primarily with patches.

The operation of the Irwin is identical to that of the Sysgen. Only the names and

Continued on page 102

SPECIFICATIONS AND COMPARISONS

FEATURE	SYSGEN	IRWIN
Operational Specs		
Power Requirements (watts)	20	14.3
Operating Temperature	40-113 F	40-113 F
Operating Humidity	20-80 %	20-80 %
Mean time before failure (MTBF)	10,000	12,000
Tape Mechanism		
Type of tape unit	cassette	cartridge
Length of tape (feet)	450	185
Formatted Capacity (MByte)	11	10.35
Number of tracks (serpentine)	4	8
Data encoding technique	GCR	MFM
Recording Density (FRPI)	6400	6400
Tape speed (Read/Write)	90" second	39" second
Tape speed (rewind/FF)	90" second	70" second
Performance Specs		
Prepare new cartridge	N/A	34 minutes
Image Save (10 meg)	4:50	16:00
Image Restore	3:50	16:00
Max B/U Capacity	11 megs	unlimited
Installation		
Slot Required	YES	NO
Internal Unit	NO	YES
Device drivers (.SYS)	YES	NO
Half height	NO	YES
COST OF UNIT EVALUATED	$ 995	$ 415

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Hard Disk
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speeds have been changed. For instance, the Sysgen program used for complete disk backups is called 'ISAVE.' The equivalent program on the Irwin is called 'IMAGE.' For a ten meg backup, the Irwin is a little slower; it takes around 16 minutes versus the Image speed of 4.5 minutes.

One important difference in the Irwin and the Sysgen has to do with the total capacity of the backup in image mode. The Sysgen Image is limited to 11 megs (the capacity of the data cassette) whereas the Irwin can use more than one data cartridge to backup a single hard disk. For instance, if you had a 20 meg hard disk, the Irwin would make the backup using 2 data cartridges whereas the Image would be unable to do it.

One interesting thing that Irwin did is the unique method of formatting. Before a virgin cartridge is formatted, a servo format is performed. This writes a signal on the tape similar to writing a line down the middle of the tape. When the tape is read or written to, this line is used to center the read/write head. This is especially useful if you are transporting cartridges from one Irwin to another as it totally eliminates read errors caused by head alignments since the head alignment is performed each time the disk is read.

A Chat with Irwin

According to Irwin, approximately 20,000 units have been produced to date. Shortly, they plan to release another version of their software which will support DOS 3.0 as well as fix several bugs in the software.

I asked Irwin if they know of any bugs in their current version of software and they advised me of two. The first problem involves backing up single files exceeding 5 megs when operating under DOS 2.0 or 2.1 and using FIP.COM. Secondly, some problems have been encountered when the hard disk is in an external chassis due to timing problems (this is a universal problem not limited to Irwin streamers). They hope to correct these problems in their new software release.

Irwin suggests replacing the data cartridges after approximately 200 backups (equal to one year of use). Since both the Image and the Irwin have provisions in their software to report read/write errors, you can see when tape replacement is actually necessary.

Conclusion

The use of streaming tape backup systems will increase dramatically as competition and consumer demand bring the prices of these units down. When shopping for a streamer, keep in mind that software as well as hardware should be considered.

The Sysgen Image is ideally suited to the business demanding frequent backups with a minimum of down time. Retailing at $995, the unit is reasonably priced and well documented.

Remember that the Image requires a full length slot on the PC and also has an external device. Drawing a total of 20 watts, this unit should not be used on an expanded PC using the standard power supply. Furthermore, because it does require a card to be installed on the mother board it is not feasible to use it as a portable and share it among several machines.

The Irwin 110, currently available for $395, is the most economical streamer available. It is a half height unit which can be mounted internally in the same way as a floppy disk or externally via the floppy disk controller card. It does not require a slot and draws only 14.5 watts. The documentation for the Irwin comes on the utility disk along with the best set of diagnostic utilities I've ever seen released by a manufacturer.

As in the case of the Sysgen, do not mount this unit inside an expanded PC without replacing the power supply. The drain of the hard disk and the Irwin may be too much. If you plan on mounting the Irwin externally, the cost of the unit, cabling, cabinet and power supply, narrow the price advantage substantially. If you require a portable unit for use with several hard disk based systems, the Irwin would certainly be the preferred streamer.

Both units will produce reliable backup protection with the only major difference being the speed at which they perform. The Sysgen would certainly be my choice for demanding commercial applications while the economical Irwin is ideally suited to the small business and home user.

For further information, contact:

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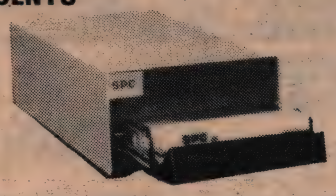

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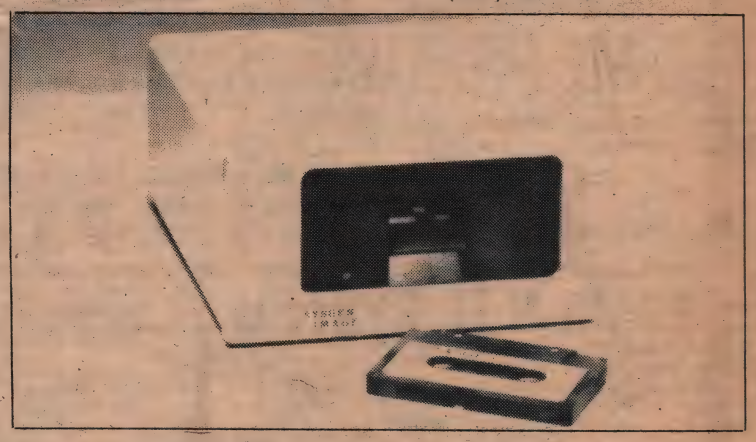
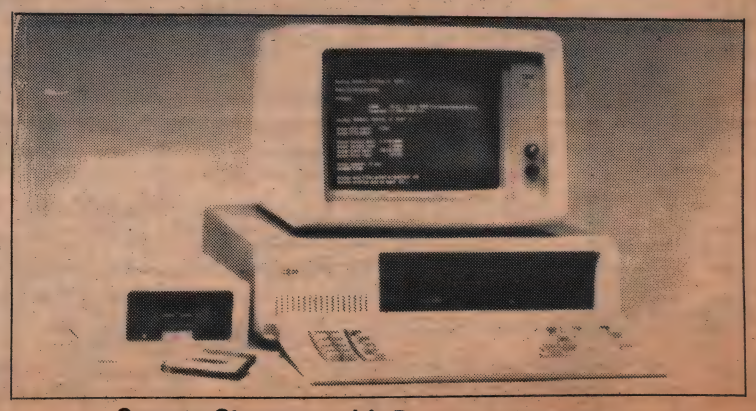


Sysgen Backup Unit and Cartridge



Sysgen Streamer with Personal Computer

Microsoft's New Macro Assembler Supports Family Of Intel 16-Bit Microprocessors

Microsoft Corporation announces a new release of Microsoft® Macro Assembler that supports the entire Intel® family of 16-bit microprocessors. The new release works with the 80186, 80286 and 80287 instruction sets, as well as with the 8086, 8087 and 8088 microprocessors supported by the previous version.

The assembler is accompanied by an extensive set of development utilities, including a symbolic debug utility that allows programmers to examine and step through their source code as well as their object code. This utility provides a controlled testing environment for programs, significantly speeding development time.

Macro Assembler Package Designed to Compliment Microsoft's High-Level Languages

The programming development tools that accompany the new Microsoft Macro Assembler release will be useful to all experienced programmers, according to Tandy Trower, Microsoft's Director of Language Marketing. These tools include an object linker, a library manager, a cross-reference utility, and a program maintenance utility, in addition to the symbolic debug utility.

"The development tools aren't just for those who write complete programs in assembly language," said Trower, "but also for those who write assembly-language modules for their high-level language programs. In fact, they will be extremely useful for any programmers who work with high-level Microsoft languages, even if they do not currently plan to use the Macro Assembler."

Trower also stated that the broad compatibility of this Macro Assembler release, together with the versatility of the development tools that come with it, make this "the most complete assembly-language development package available for the MS-DOS™ environment."

One of the main differences between the new Microsoft Macro Assembler release and the previous version is that the new release supports a broader variety of processors. In addition to the 8086/8088 environment supported by the previous release, the new version also includes 80286 and 80186 opcodes and pseudo ops, allowing programmers to write applications that run on the full Intel 80 series of microprocessors. This means that programs written with the new Macro Assembler will run on some of the newer 16-bit computers, including the IBM® PC AT.

The new release also includes switches to select case sensitivity. This means that users will be able to preserve lower-case letters in their programs (for example, in referring to names and procedures).

All of the features found in the previous version are also present in the new version. These include:

- Relaxed typing of statements to reduce syntax errors and speed program development.
- The ability to define and use macros, allowing programmers to efficiently handle commonly used sequences of instructions.
- The ability to call (and be called by) other routines—including those written in other high-level Microsoft languages (Microsoft FORTRAN, Microsoft Pascal, Microsoft C, Microsoft BASIC Compiler, Microsoft COBOL).
- Conditional assembly capability, allowing programmers to create and test different program versions.

New Programming Tools Speed Development Time

The Symbolic Debug Utility that comes with the new Macro Assembler package offers significant enhancements over the previous MS-DOS DEBUG utility:

- It displays source code lines in FORTRAN, Pascal, and C, as well as in machine code, significantly speeding the debugging process.
- It allows the programmer to set breakpoints using both line numbers and symbols.
- It allows the programmer to single-step through an entire program, following its execution at either the assembly level or the source level.
- It includes an on-line "Help" function, offering assistance with command syntax.

In addition, the new debugger includes all of the capabilities offered by the previous version. For example, it allows programmers to:

- Use the debugger for any program written in a Microsoft high-level language—Microsoft FORTRAN, Microsoft Pascal, Microsoft C, Microsoft BASIC Compiler, and Microsoft COBOL—as well as for assembly-language programs.
- "Disassemble" object code, producing results that look like source code.
- Make minor changes with

Continued on page 109

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74LS112	.39	74LS374	1.39
74LS113	.39	74LS375	.95
74LS114	.39	74LS377	1.39
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4.0 MHz

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6.0 MHz

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6500

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6522	5.49
6532	9.95
6545	9.95
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6800	2.95
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6809E	8.95
6809	8.95
6810	2.95
6820	4.35
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6828	14.95
6840	12.95
6843	34.95
6844	25.95
6845	12.95
6847	11.95
6850	3.25
6852	5.75
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6880	2.25
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6800=1 MHz

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68B09	11.95
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68B21	5.95
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68B00=2 MHz

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8039	5.95
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8212	1.80
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8226	1.80
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74S04	.35	74S140	.55	74S257	.95
74S05	.35	74S151	.95	74S258	.95
74S08	.35	74S153	.95	74S260	.79
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74S134	.50	74S241	2.20	87S181	16.25
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7400

7400	.19	7483	.50	74172	5.95
7401	.19	7485	.59	74173	.75
7402	.19	7486	.35	74174	.89
7403	.19	7489	2.15	74175	.89
7404	.19	7490	.35	74176	.89
7405	.25	7491	.40	74177	.75
7406	.29	7492	.50	74178	1.15
7407	.29	7493	.35	74179	1.75
7408	.24	7494	.65	74180	.75
7409	.19	7495	.55	74181	2.25
7410	.19	7496	.70	74182	.75
7411	.25	7497	2.75	74184	2.00
7412	.30	74100	1.75	74185	2.00
7413	.35	74105	1.14	74189	2.99
7414	.49	74107	.30	74190	1.15
7416	.25	74109	.45	74191	1.15
7417	.25	74110	.45	74192	.79
7420	.19	74111	.55	74193	.79
7421	.35	74116	1.55	74194	.85
7422	.35	74120	1.20	74195	.85
7423	.29	74121	.29	74196	.79
7425	.29	74122	.45	74197	.75
7426	.29	74123	.49	74198	1.35
7427	.29	74125	.45	74199	1.35
7428	.45	74126	.45	74221	1.35
7430	.19	74128	.55	74246	1.35
7432	.29	74132	.45	74247	1.25
7433	.45	74136	.50	74248	1.85
7437	.29	74141	.65	74249	1.95
7438	.29	74142	2.95	74251	.75
7439	.79	74143	4.95	74259	2.25
7440	.19	74144	2.95	74265	1.35
7442	.49	74145	.60	74273	1.95
7443	.65	74147	1.75	74276	1.25
7444	.69	74148	1.20	74278	3.11
7445	.69	74150	1.35	74279	.75
7446	.69	74151	.55	74283	2.00
7447	.69	74152	.65	74284	3.75
7448	.69	74153	.55	74285	3.75
7450	.19	74154	1.25	74290	.95
7451	.23	74155	.75	74293	.75
7453	.23	74156	.65	74298	.85
7454	.23	74157	.55	74351	2.25
7460	.23	74159	1.65	74365	.65
7470	.35	74160	.85	74366	.65
7472	.29	74161	.69	74367	.65
7473	.34	74162	.85	74368	.65
7474	.33	74163	.69	74376	2.20
7475	.45	74164	.85	74390	1.75
7476	.35	74165	.85	74393	1.35
7480	.59	74166	1.00	74425	3.15
7481	1.10	74167	2.96	74426	.85
7482	.95	74170	1.65	74490	2.55

CMOS

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4001	.25	4538	1.95
4002	.25	4539	1.95
4006	.89	4541	2.64
4007	.29	4543	1.19
4008	.95	4553	5.79
4009	.39	4555	.95
4010	.45	4556	.95
4011	.25	4558	2.45
4012	.25	4560	4.25
4013	.38	4569	3.49
4014	.79	4581	1.95
4015	.39	4582	1.95
4016	.39	4584	.75
4017	.69	4585	.75
4018	.79	45151	12.95
4019	.39	4702	12.95
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4022	.79	74C02	.35
4023	.29	74C04	.35
4024	.65	74C08	.35
4025	.29	74C10	.35
4026	1.65	74C14	.59
4027	.45	74C20	.35
4028	.69	74C30	.35
4029	.79	74C32	.39
4030	.39	74C42	1.29
4034	1.95	74C48	1.99
4035	.85	74C73	.65
4040	.75	74C74	.65
4041	.75	74C76	.80
4042	.69	74C83	1.95
4043	.85	74C85	1.95
4044	.79	74C86	.39
4046	.85	74C89	4.50
4047	.95	74C90	1.19
4048	.69	74C93	1.75
4049	.35	74C95	.99
4050	.35	74C150	5.75
4051	.79	74C151	2.25
4052	1.99	74C154	3.25
4053	.79	74C157	1.75
4060	.89	74C160	1.19
4066	.39	74C161	1.19
4068	.39	74C162	1.19
4069	.29	74C163	1.19
4070	.35	74C164	1.39
4071	.29	74C165	2.00
4072	.29	74C173	.79
4073	.29	74C174	1.19
4075	.29	74C175	1.19
4076	.79	74C192	1.49
4077	.59	74C193	1.49
4078	.29	74C195	1.39
4081	.29	74C200	5.75
4082	.29	74C221	1.75
4085	.95	74C244	2.25
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4093	.49	74C374	2.45
4094	2.99	74C901	.39
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14409	12.95	74C905	10.95
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4520	.79	74C928	7.95
4521	4.99	74C929	19.95
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4527	1.95	80C96	.95
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A new family of high speed CMOS logic featuring the speed of low power Schottky (8ns typical gate propagation delay), combined with the advantages of CMOS: very low power consumption, superior noise immunity, and improved output drive.

74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

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74HC08	.59	74HC195	1.09
74HC10	.59	74HC238	1.35
74HC11	.59	74HC240	1.89
74HC14	.79	74HC241	1.89
74HC20	.59	74HC242	1.89
74HC27	.59	74HC243	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC251	.89
74HC74	.75	74HC257	.85
74HC75	.85	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC367	.99
74HC125	1.19	74HC373	2.29
74HC132	1.19	74HC374	2.29
74HC138	.99	74HC393	1.39
74HC139	.99	74HC4017	1.99
74HC151	.89	74HC4020	1.39
74HC153	.89	74HC4024	1.59
74HC154	2.49	74HC4040	1.39
74HC157	.89	74HC4049	.89
74HC161	1.15	74HC4050	.89
74HC164	1.25	74HC4060	1.29
74HC166	2.95	74HC4511	2.39
74HC174	.99	74HC4538	2.29

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

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74HCT02	.69	74HCT193	1.39
74HCT04	.69	74HCT194	1.19
74HCT08	.69	74HCT195	1.29
74HCT10	.69	74HCT238	1.49
74HCT11	.69	74HCT240	2.19
74HCT14	.89	74HCT241	2.19
74HCT20	.69	74HCT242	2.19
74HCT27	.69	74HCT243	2.19
74HCT30	.69	74HCT244	2.19
74HCT32	.79	74HCT245	2.19
74HCT51	.69	74HCT251	1.09
74HCT74	.85	74HCT257	.99
74HCT75	.95	74HCT259	1.59
74HCT85	1.49	74HCT273	2.09
74HCT86	.79	74HCT299	5.25
74HCT93	1.29	74HCT367	1.09
74HCT125	1.29	74HCT373	2.49
74HCT132	1.29	74HCT374	2.49
74HCT138	1.15	74HCT393	1.59
74HCT139	1.15	74HCT4017	2.19
74HCT151	1.05	74HCT4020	1.59
74HCT153	1.05	74HCT4024	1.79
74HCT154	2.99	74HCT4040	1.59
74HCT157	.99	74HCT4049	.99
74HCT161	1.29	74HCT4050	.99
74HCT164	1.39	74HCT4060	1.49
74HCT166	3.05	74HCT4511	2.69
74HCT174	1.09	74HCT4538	2.59

VOLTAGE REGULATORS

TO-220 CASE PACKAGE

7805T	.75	7905T	.85
7808T	.75	7908T	.85
7812T	.75	7912T	.85
7815T	.75	7915T	.85
7824T	.75	7924T	.85

TO-3 CASE PACKAGE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49
7815K	1.39	7915K	1.49
7824K	1.39	7924K	1.49

TO-92 CASE PACKAGE

78L05	.69	79L05	.79
78L12	.69	79L12	.79
78L15	.69	79L15	.79

OTHER VOLTAGE REGS

78M05C	5volt	½amp	TO-220	.35
LM323K	5volt	3amp	TO-3	4.95
LM338K	Adj.	5amp	TO-3	3.95
78H05K	5volt	5amp	TO-3	9.95
78H12K	12volt	5amp	TO-3	9.95
78P05K	5volt	10amp	TO-3	14.95
UA78S40	FAIRCHILD		DIP	1.95

LINEAR

LM301	.34	LM567	.89
LM301H	.79	NE570	3.95
LM307	.45	NE571	2.95
LM308	.69	NE590	2.50
LM308H	1.15	NE592	.98
LM309H	1.95	LM709	.59
LM309K	1.25	LM710	.75
LM310	1.75	LM711	.79
LM311	.64	LM723	.49
LM311H	.89	LM723H	.55
LM312H	1.75	LM733	.98
LM317K	3.95	LM741	.35
LM317T	1.19	LM741N-14	.35
LM318	1.49	LM741H	.40
LM318H	1.59	LM747	.69
LM319H	1.90	LM748	.59
LM319	1.25	LM1014	1.19
LM320	see7900	LM1303	1.95
LM322	1.65	LM1310	1.49
LM323K	4.95	MC1330	1.69
LM324	.59	MC1349	1.89
LM329	.65	MC1350	1.19
LM331	3.95	MC1358	1.69
LM334	1.19	MC1372	6.95
LM335	1.40	LM1414	1.59
LM336	1.75	LM1458	.59
LM337T	1.95	LM1488	.69
LM337K	3.95	LM1489	.69
LM338K	3.95	LM1496	.85
LM339	.99	LM1558H	3.10
LM340	see7800	LM1800	2.37
LM348	.99	LM1812	8.25
LM350K	4.95	LM1830	3.50
LM350T	4.60	LM1871	5.49
LM358	.69	LM1872	5.49
LM359	1.79	LM1877	3.52
LM376	3.75	LM1889	1.95
LM377	1.95	LM1896	1.75
LM378	2.50	ULN2003	1.29
LM379	4.50	XR2206	3.75
LM380	.89	LM2877	2.05
LM380N-8	1.10	LM2878	2.25
LM381	1.60	LM2900	.85
LM382	1.60	LM2901	1.00
LM383	1.95	MPQ2907	1.95
LM384	1.95	LM2917	2.95
LM386	.89	LM3900	.59
LM387	1.40	LM3905	1.25
LM389	1.35	LM3909	.98
LM390	1.95	LM3911	2.25
LM392	.69	LM3914	3.95
LM393	1.29	LM3915	3.95
LM394H	4.60	LM3916	3.95
LM399H	5.00	MC4024	3.95
NE531	2.95	MC4044	4.50
NE555	.34	RC4136	1.25
NE556	.65	RC4151	3.95
NE558	1.50	LM4250	1.75
NE564	2.95	LM4500	3.25
LM565	.99	RC4558	.69
LM566	1.49	LM13600	1.49
		LM13700	1.45

H=TO-5 CAN, K=TO-3, T=TO-220

RCA

CA3023	2.75	CA3083	1.55
CA3039	1.29	CA3086	.80
CA3046	1.25	CA3089	2.99
CA3059	2.90	CA3096	3.49
CA3060	2.90	CA3130	1.30
CA3065	1.75	CA3140	1.15
CA3080	1.10	CA3146	1.85
CA3081	1.65	CA3160	1.19
CA3082	1.65	CA3183	.99

TI

TL494	4.20	75365	1.95
TL496	1.65	75450	.59
TL497	3.25	75451	.39
75107	1.49	75452	.39
75108	1.49	75453	.39
75110	1.95	75454	.39
75150	1.95	75491	.79
75154	1.95	75492	.79
75188	1.25	75493	.89
75189	1.25	75494	.89

BI FET

TL066	.99	LF347	2.19
TL071	.79	LF351	.60
TL072	1.19	LF353	1.00
TL074	2.19	LF355	1.10
TL081	.79	LF356	1.10
TL082	1.19	LF357	1.40
TL083	1.19	LF411	1.29
TL084	2.19	LF412	1.99

SPECTRONICS CORPORATION

EPROM ERASERS

	Timer	Capacity Chip	Intensity (uW/Cm²)	
PE-14		9	8,000	$83.00
PE-14T	x	9	8,000	$119.00
PE-24T	x	12	9,600	$175.00
PL-265T	x	30	9,600	$255.00
PR-125T	x	25	17,000	$349.00
PR-320T	x	42	17,000	$595.00

TRANSISTORS

2N918	.50	2N3772	1.85
MPS918	.25	2N3903	.25
2N2102	.75	2N3904	.10
2N2218	.50	2N3906	.10
2N2218A	.50	2N4122	.25
2N2219	.50	2N4123	.25
2N2219A	.50	2N4249	.25
2N2222	.25	2N4304	.75
PN2222	.10	2N4401	.25
MPS2369	.25	2N4402	.25
2N2484	.25	2N4403	.25
2N2905	.50	2N4857	1.00
2N2907	.25	PN4916	.25
PN2907	.13	2N5086	.25
2N3055	.79	PN5129	.25
3055T	.69	PN5139	.25
2N3393	.30	2N5209	.25
2N3414	.25	2N6028	.35
2N3563	.40	2N6043	1.75
2N3565	.40	2N6045	1.75
PN3565	.25	MPS-A05	.25
MPS3638	.25	MPS-A06	.25
MPS3640	.25	MPS-A13	.40
PN3643	.25	MPS-A55	.25
PN3644	.25	MPU-131	.99
MPS3704	.15	TIP29	.65
MPS3706	.15	TIP31	.75
		TIP32	.79

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL

ST=SOLDERTAIL

8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80

WW=WIREWRAP

INTERFACE

8T26	1.59
8T28	1.98
8T95	.89
8T96	.89
8T97	.89
8T98	.89
DM8131	2.95
DP8304	2.29
DS8833	2.25
DS8835	1.99
DS8836	.99
DS8837	1.65
DS8838	1.30

INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	3.95
ICM7207A	5.59
ICM7208	15.95

DATA AQC

ADC0800	15.55
ADC0804	3.49
ADC0809	4.49
ADC0816	14.95
ADC0817	9.95
ADC0831	8.95
DAC0800	4.49
DAC0806	1.95
DAC0808	2.95
DAC1020	8.25
DAC1021	7.95
DAC1022	5.95
MC1408L6	1.95
MC1408L8	2.95

EXAR

XR2206	3.75
XR2207	3.75
XR2208	3.75
XR2211	5.25
XR2240	3.25

9000

9304	.95
9316	1.00
9328	1.49
9334	2.50
9368	3.95
9401	9.95
9601	.75
9602	1.50
9637	2.95
96S02	1.95

SOUND CHIPS

76477	3.95
76488	5.95
76489	8.95
SSI-263	39.95
AY3-8910	12.95
AY3-8912	12.95
MC3340	1.49
SP1000	39.00

OPTO-ISOLATORS

4N26	1.00	MCA-7	4.25
4N27	1.10	MCA-225	1.75
4N28	.69	IL-1	1.25
4N33	1.75	ILA-30	1.25
4N35	1.25	ILQ-74	2.75
4N37	1.25	H11C5	1.25
MCT-2	1.00	TIL-111	1.00
MCT-6	1.50	TIL-113	1.75

VISA MasterCard

MICRODEVICES AT MICROPRICES

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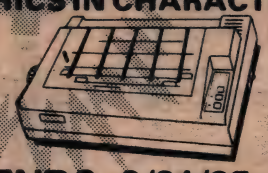
DB25S RS232 FEMALE SOLDER CUP 2.25

DB25P RS232 MALE SOLDER CUP 1.90

BARGAIN HUNTERS CORNER
BMC BX-80 PRINTER

- ★ 80 CPS DOT MATRIX PRINTER
- ★ PRINTS BI-DIRECTIONAL IN 40, 80, 71 OR 142 COLUMNS IN NORMAL, DOUBLE WIDTH OR COMPRESSED TEXT.
- ★ PRINT SUPERSCRIPT AS WELL AS SUPERB GRAPHICS IN CHARACTER OR BIT IMAGE.



$199.95

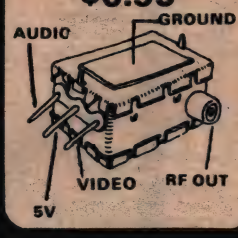
SPECIAL ENDS 3/31/85

RF MODULATOR
(ASTEC UM1082)

QUANTITIES LIMITED

- * PRESET TO CHANNEL 3
- * USE TO BUILD TV-COMPUTER INTERFACE
- * +5 VOLT OPERATION

$6.95



EMI FILTER
- * MAJOR MANUFACTURER
- * LOW COST
- * FITS LC-HP BELOW

$4.95

LINE CORDS

LC-2	2 CONDUCTOR	6 ft	.39
LC-3	3 CONDUCTOR	6 ft	.99
LC-HP	3 CONDUCTOR WITH STANDARD FEMALE SOCKET	6 ft	1.49
LC-CIR	CIGARETTE LIGHTER PLUG WITH 6 ft COILED CORD		2.95

MUFFIN FANS

4.68" SQUARE	14.95
3" SQUARE	14.95

CAPACITORS

TANTALUM

1.0µf	15V	.40	.47µf	35V	.50
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	560	50V	.05
22	50V	.05	680	50V	.05
25	50V	.05	820	50V	.05
27	50V	.05	.001µf	50V	.05
33	50V	.05	.0015	50V	.05
47	50V	.05	.0022	50V	.05
56	50V	.05	.005	50V	.05
68	50V	.05	.01	50V	.07
82	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	4.7	16V	.14
4.7	50V	.15	10	16V	.14
10	50V	.15	10	50V	.16
47	35V	.18	22	16V	.14
100	16V	.18	47	50V	.20
220	35V	.20	100	15V	.20
470	25V	.30	100	35V	.25
2200	16V	.60	220	25V	.30
			330	16V	.40
COMPUTER GRADE			550	16V	.42
			1000	16V	.60
			2200	16V	.70
44,000µf 30V 3.95			6000	16V	.85

RESISTORS
¼ WATT 5% CARBON FILM
ALL STANDARD VALUES
FROM 1 OHM TO 10 MEG OHM

50 PIECES SAME VALUE	.025
100 PIECES SAME VALUE	.02
1000 PIECES SAME VALUE	.015

BYPASS CAPS

.01 µf DISC	100/$6.00
.01 µf MONOLITHIC	100/$12.00
.1 µf DISC	100/$8.00
.1 µf MONOLITHIC	100/$15.00

DIODES

1N751	5.1 VOLT ZENER	.25
1N759	12.0 VOLT ZENER	.25
1N4148	(1N914)SWITCHING	25/1.00
1N4001	50PIV 1A	12/1.00
1N4004	400PIV RECTIFIER	10/1.00
1N5402	200PIV 3A	.25
KBP02	200PIV 1.5A BRIDGE	.45
KBP04	400PIV 1.5A BRIDGE	.55
MDA801	50PIV 12A BRIDGE	1.39
MDA980-1	50PIV 12A BRIDGE	1.95
MDA980-2	100PIV 12A BRIDGE	2.25
VM48	DIP-BRIDGE	.35

LED DISPLAYS

HP5082-7760	CC	.43"	1.29
MAN-72	CA	.3"	.99
MAN-74	CC	.3"	.99
FND-357(359)	CC	.375"	1.25
FND-500(503)	CC	.5"	1.49
FND-507(510)	CA	.5"	1.49
TIL-311 4x7 HEX W/LOGIC		.270"	9.95

HARD TO FIND "SNAPABLE" HEADERS

Can easily be snapped apart to make any size header, all with .1" centers

1x36	STRAIGHT LEAD	.99
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS

SPACED AT .1" CENTERS
IDEAL FOR DISK DRIVES
OR ANY .1" HEADER

5/1.00

DIP SWITCHES

4 POSITION	.85
5 POSITION	.90
6 POSITION	.90
7 POSITION	.95
8 POSITION	.95
10 POSITION	1.29

EDGECARD CONNECTORS

S-100 ST	S-100	3.95
S-100 WW	S-100	4.95
72 PIN ST		6.95
72 PIN WW		7.95
62 PIN ST	IBM PC	4.95
50 PIN ST	APPLE	4.95
44 PIN ST		2.95
44 PIN WW		4.95

36 PIN CENTRONICS

IDCEN36	RIBBON CABLE MALE	8.95
IDCEN36/F	RIBBON CABLE FEMALE	8.95
CEN36	SOLDER CUP MALE	7.95

HEAT SINKS

TO-220	SCREW ON	.35
TO-220	CLIP ON	.35
TO-3	SCREW ON	.95
TO-220	INSULATOR	10/1.00
TO-3	INSULATOR	10/1.00

SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
BCD OUT	10 POSITION 6 PIN DIP	1.95

DIFFUSED LEDS

		1-99	100-up
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.18	.15
JUMBO YELLOW	T1¾	.18	.15
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09
MINI GREEN	T1	.18	.15
MINI YELLOW	T1	.18	.15
RECT RED	2x5mm	.25	.22
RECT GREEN	2x5mm	.30	.27
RECT YELLOW	2x5mm	.30	.27

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.99	.99	.99	1.69	1.89	1.89	1.99	2.49	2.99
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

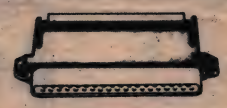
FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS				
			9	15	25	37	50
SOLDER CUP	MALE	DBxxP	1.19	1.59	1.90	2.85	4.25
	FEMALE	DBxxS	1.50	1.85	2.25	3.90	5.25
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.65	2.20	3.00	4.83	---
	FEMALE	DBxxSR	2.18	3.03	3.00	6.19	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.95	3.90	4.75	6.95	---
	FEMALE	IDBxxS	3.25	4.29	5.25	7.95	---
HOODS	BLACK	HOOD-B	---	---	.99	---	---
	GREY	HOOD	.89	.99	.99	1.09	1.19

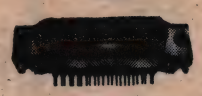
MOUNTING HARDWARE-$1.00

FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW



IDB37S

DB37S



DB25SR

TEXTOOL ZERO INSERTION FORCE SOCKETS AND RECEPTACLES

SCREWDRIVER CLAMP
ECONO ZIF

LEVER CLAMP
ZIF SOCKET

WW RECEPTACLES
ZIF RECEPTACLE

TYPE	CONTACTS				
	14	16	24	28	40
ECONO ZIF	---	4.95	6.75	7.75	9.95
ZIF SOCKET	4.95	4.95	5.95	6.95	9.95
ZIF RECEPTACLE	8.25	8.75	9.75	10.50	12.75

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED. EXAMPLE: A 10 PIN RIGHT ANGLE HOLDER STYLE WOULD BE IDH10SR

IDH20WR

IDE50

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.83	7.30
16	.28	2.50	1.00	8.80
20	.36	3.20	1.25	11.00
25	.45	4.00	1.32	11.60
26	.46	4.10	1.32	11.60
34	.61	5.40	1.65	14.50
40	.72	6.40	1.92	16.80
50	.89	7.50	2.50	22.00

JDR Microdevices

1224 S. Bascom Avenue, San Jose, CA 95128

800-538-5000 • 800-662-6279 (CA) • (408) 995-5430

FAX (408) 275-8415 • Telex 171-110

RETAIL STORE - 1256 S. BASCOM AVENUE

HOURS: M-W-F, 9-5 TU-TH, 9-9 SAT, 10-3

PLEASE USE YOUR CUSTOMER NUMBER WHEN ORDERING

TERMS: Minimum order $10.00. For shipping and handling include $2.50 for UPS Ground and $3.50 for UPS Air. Orders over 1 lb. and foreign orders may require additional shipping charges - please contact our sales department for the amount. CA. residents must include 6% sales tax. Bay Area and LA residents include 6½%. All merchandise is warranted for 90 days unless otherwise stated. Prices are subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sale.

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IBM PC PROTOTYPE CARD WITH DECODING CIRCUITRY $29.95

WIRE WRAP PROTOTYPE CARDS

FR-4 EPOXY GLASS LAMINATE WITH GOLD-PLATED EDGE-CARD FINGERS

IBM-PR2

IBM

BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

IBM-PR1	WITH +5V AND GROUND PLANE	$27.95
IBM-PR2	AS ABOVE WITH DECODING CIRCUITRY	$29.95

S-100

P100-1	BARE - NO FOIL PADS	$15.15
P100-2	HORIZONTAL BUS	$21.80
P100-3	VERTICAL BUS	$21.80
P100-4	SINGLE FOIL PADS PER HOLE	$22.75

APPLE

P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

GENERAL PURPOSE

22/44 PIN EDGE-CARD (.156" SPACING)

P441-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P441-3	VERTICAL BUS 4.5" x 6.0"	$13.95
P441-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P442-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P442-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P442-4	SINGLE FOIL PADS 4.5" x 9.0"	$13.50

36/72 PIN EDGE-CARD (.1" SPACING)

P721-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P721-3	VERTICAL BUS 4.5" x 6.0"	$13.25
P721-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P722-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P722-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P722-4	SINGLE FOIL PADS 4.5" x 9.0"	$15.15

BARE GLASS BOARDS

NO EDGE-CARD FINGERS OR FOIL

P25x45	2.5" x 4.5"	$2.40
P45x65	4.5" x 6.5"	$4.70
P45x85	4.5" x 8.5"	$6.20
P45x170	4.5" x 17.0"	$11.35
P85x170	8.5" x 17.0"	$18.95

EXTENDER CARDS

IBM	$45.00
APPLE	$45.00
MULTIBUS	$86.00

DISK DRIVES

TANDON

TM 100-1	5¼" (FOR IBM) SS/DD	$199.00
TM 100-2	5¼" (FOR IBM) DS/DD	$199.95

MPI

MPI-B52	5¼" (FOR IBM) DS/DD	$139.95

TEAC

FD-55B	½ HEIGHT DS/DD	$139.95
FD-55F	½ HEIGHT DS/QUAD	$200.00

TEAC FD-55B

SHUGART

SA 400L	5¼" (40 TRACK) SS/DD	$199.95
SA 460	5¼" (80 TRACK) DS/QUAD	$199.95

8" DISK DRIVES

FD100-8	BY SIEMENS, SHUGART 801 EQUIV. SS/DD 10/$129.95 ea.	$149.95
FD200-8	BY SIEMENS, SHUGART 851 EQUIV. DS/DD 10/$185.00 ea.	$195.00

JFORMAT-2 $49.95
SUPPORT FOR QUAD DENSITY DRIVES FROM TALL TREE SYSTEMS

TANDON TM100-2

PLEASE INCLUDE SUFFICENT AMOUNT FOR SHIPPING ON ABOVE ITEMS

DISK DRIVE CABINETS

CABINET #1 $29.95
- Fits one full height 5¼"disk drive
- Color matches Apple

CABINET #2 $79.00
- Fits one full height 5¼"disk drive
- Complete with power supply, switch, line cord, fuse and standard power connector
- Please specify Grey or Tan

CABINET #3 $89.95
- Fits two half height 5¼"disk drives
- Complete with power supply, switch, line cord, fuse and standard power connectors

8" DISK DRIVE CABINETS ALSO AVAILABLE-PLEASE CALL

PLEASE INCLUDE SUFFICIENT AMOUNT FOR SHIPPING ON ABOVE ITEMS

SWITCHING POWER SUPPLIES

PS-IBM $175.00
- FOR IBM PC-XT COMPATIBLE
- 130 WATTS
- +5V @ 15A, +12V @ 4.2A -5V @ .5A, -12V @ .5A
- ONE YEAR WARRANTY

PS-A $49.95
- USE TO POWER APPLE TYPE SYSTEMS
- +5V @ 4A, +12V @ 2.5A -5V @ .5A, -12V @ .5A
- APPLE POWER CONNECTOR

PS-3 $39.95
- AS USED IN APPLE III
- +5V @ 4A, +12V @ 2.5A -5V @ .25A, -12V @ .30A,
- 15.5" x 4.5" x 2", .884 LBS.

PS-ASTEC $19.95
- CAN POWER TWO 5¼" FDDS
- +5V @ 2.5A, +12V @ 2A -12V @ .1A
- +5V @ 5A IF +12V IS NOT USED
- 6.3" x 4.0" x 1.9"

OK INDUSTRIES

EX-1 IC EXTRACTION TOOL
- ONE PIECE METAL CONSTRUCTION
- EASILY EXTRACTS 8-24 PIN DEVICES
- LOW COST $2.19

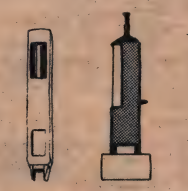
EX-1

EX-2 IC EXTRACTION TOOL
- EXTRACTS 24-40 PIN DEVICES
- HEAVY DUTY METAL CONSTRUCTION
- GROUND LUGS FOR MOS EXTRACTIONS
- EASY ONE HAND OPERATION $12.74

IC INSERTION TOOLS

INS-1416	for 14-16 pin IC's	$5.15
MOS-1416	for 14-16 pin IC's	$10.92
MOS-2428	for 24-28 pin IC's	$10.92
MOS-40	for 40 pin IC's	$12.43

MOS series insertion tools have metal constuction and include grounding lug for CMOS applications.



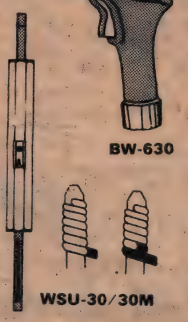
INS-1416 INS-2428

BW-630 WIRE WRAP GUN
- BATTERY POWERED-USES 2 NI-CAD C CELLS(NOT INCLUDED)
- POSITIVE INDEXING
- ANTI-OVERWRAP DEVICE $41.55

BW-630

WSU-30 WIRE WRAP TOOLS
- WRAPS, STRIPS, AND UNWRAPS
- WSU-30M WRAPS AN EXTRA TURN OF INSULATION

WSU-30 $8.84/WSU-30M $10.14



WSU-30/30M

WIRE WRAP TERMINALS

WWT-1	SLOTTED	25/$7.06
WWT-2	SINGLE SIDED	25/$4.25
WWT-3	IC SOCKET	25/$7.06
WWT-4	DOUBLE SIDED	25/2.80
INS-1	INSERTION TOOL	$3.64

WIRE DISPENSER
- WITH 50' ROLL OF WIRE
- BUILT IN PLUNGER CUTS WIRE
- BUILT IN STRIPPER STRIPES 1"
- REFILLABLE

WD-30 $6.50 Specify Blue, white, Yellow or Red

WD-30TRI $9.50 With 50' of each: Red, Blue and White

SOCKET-WRAP I.D.™
- SLIPS OVER WIRE WRAP PINS
- IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
- CAN WRITE ON PLASTIC; SUCH AS IC #

PINS	PART#	PCK. OF	PRICE
8	IDWRAP 08	10	1.95
14	IDWRAP 14	10	1.95
16	IDWRAP 16	10	1.95
18	IDWRAP 18	5	1.95
20	IDWRAP 20	5	1.95
22	IDWRAP 22	5	1.95
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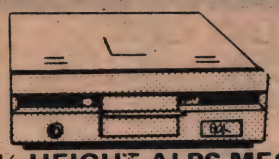

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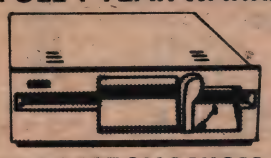

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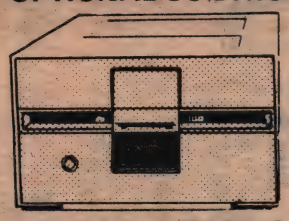

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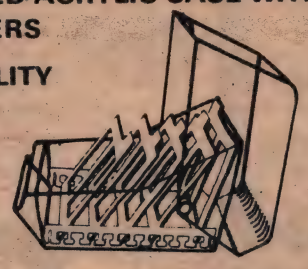

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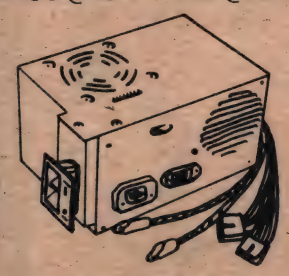

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Microsoft's
Continued from page 103

the "line-at-a-time" assembler, thereby avoiding the need to reassemble the entire program.

Another new offering among the development tools is Microsoft's Program Maintenance Utility, MAKE, which automatically updates a program after one or more of its source files have been changed. This utility, like the symbolic debug utility, works with all Microsoft high-level languages as well as with the Macro Assembler.

The development tools package also includes updated versions of all utilities offered with the previous release. These include:

- Object Linker (LINK)—A tool that allows Microsoft Macro Assembler routines to be linked with programs written in high-level Microsoft languages. Thus, programmers can take advantage of the faster executing speed of the Macro Assembler for portions of the program where speed is important, while retaining the convenience of high-level languages for the bulk of the program. A key feature of the new LINK is its simple overlay linking capability, which allows programmers to use multiple overlays in their programs.

- Library Manager (LIB)—A tool that allows programmers to create, organize, and maintain object module libraries. This utility also works with object modules created using both high-level Microsoft languages and the Macro Assembler. A new feature of this version of LIB is the variable nature of the internal page size, which reduces the amount of wasted space inside a library. This version also significantly increases the number of public symbols that can be used—from a previous 1000 to 3000 or more.

- Cross-Reference Utility (CREF)—A tool that creates a cross-reference listing of the definitions and locations of all symbols used in an assembly language program. This is helpful not only for writing programs, but

Continued on page 110

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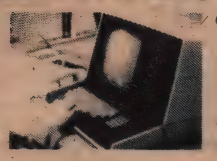

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Microsoft's
Continued from page 109

also for debugging and maintaining them.

The minimum system requirements for using the new Microsoft Macro Assembler are 128K of RAM, one disk drive (although two are recommended), and MS-DOS 2.0 or higher.

Those who have a copy of the earlier release (either the Microsoft or the IBM version) will be able to upgrade it for a nominal fee by writing to Microsoft's Customer Service Department. For new purchasers, the suggested retail price is $150.

The new Microsoft Macro Assembler package is available now through all Microsoft retail outlets. It can also be purchased by calling Microsoft's Telemarketing Sales group at 1-800-426-9400.

For more information, contact Microsoft Corporation, 10700 Northup Way, Box 97200, Bellevue, WA 98009.

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A new, sophisticated yet low cost means of linking IBM Personal Computers and office telephones has been introduced by Modern Technologies International, Inc. (ModTech).

ModTech's UltraLink, priced at $895, is a cost effective, high performance alternative to such products as Rolm Corporation's recently introduced Cedar ($4245) and Juniper ($1360). The ModTech offering has been designed to appeal to a broader range of business users.

A PC plug-in board, UltraLink converts the personal computer and telephone into a single unit designed to meet all of today's business environment needs. The user can be performing a task on the computer, decide he needs input from a source across the country and in a matter of seconds, the computer is turned into a sophisticated telecommunications instrument. While a discussion is underway on the telephone, the parties involved can be simultaneously reviewing data on the PC screen.

Among UltraLink's features are the combination of voice and data communications on a single phone line, simple and immediate access to telecommunications functions, the ability to send a "screen view" with one keystroke to any office in the world and the simultaneous error checking of transferred files.

Unlike Rolm's new products, which are tied to its private branch exchanges, UltraLink works with standard AT&T phone lines. It includes its own on-board RAM and power supply, remaining invisible to the PC when it's not in use. In addition, it replaces external modems and modem technology and while it maintains up to a 200 number directory, it does not impact the phone in any way. The new product communicates with non-UltraLink modems and works invisibly with the operating system, eliminating the need for user to learn new commands or partition system memory.

For more information, contact Modern Technologies International, Inc., 656 Bair Island Road, Suite 302, Redwood City, CA 94063.

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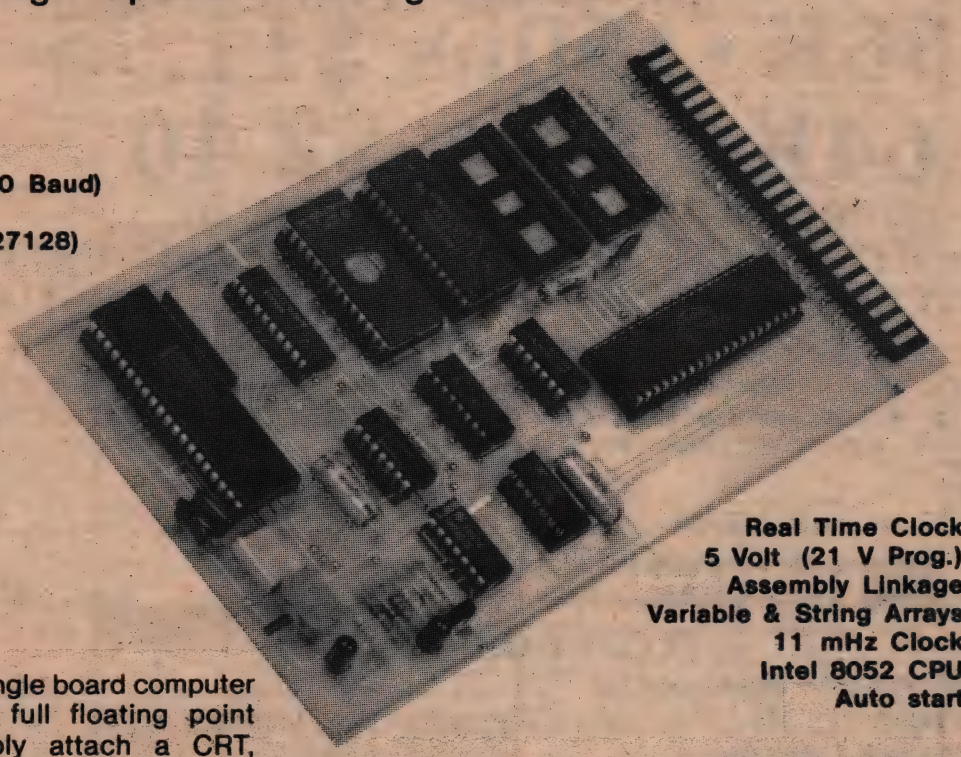

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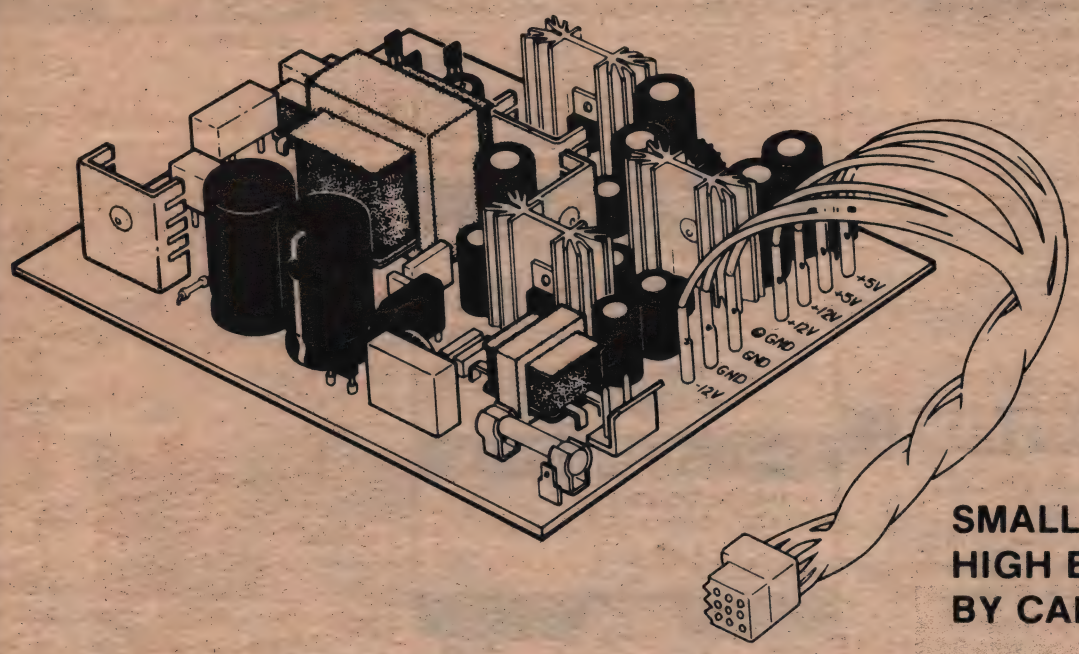

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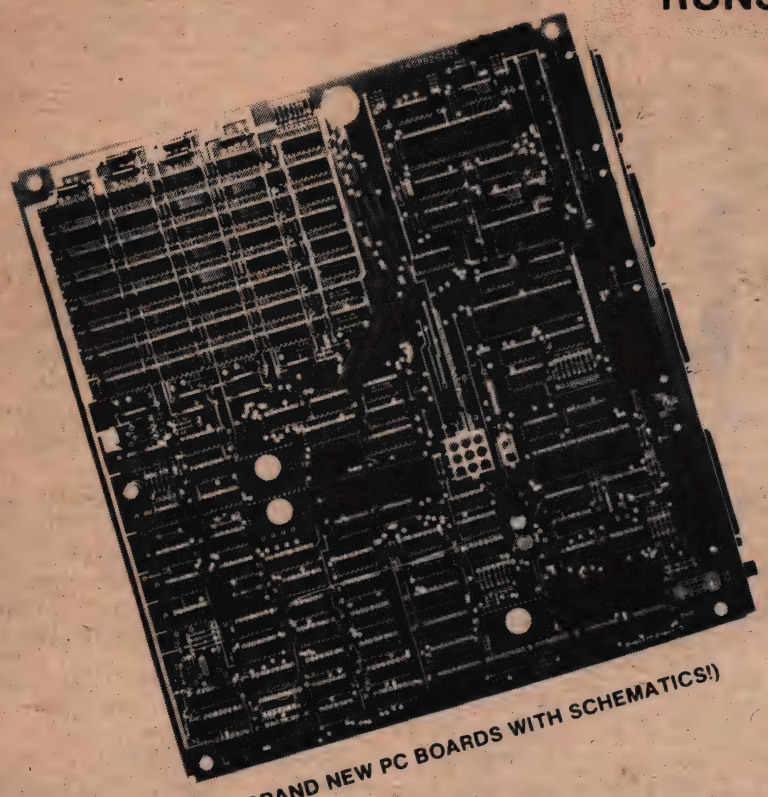

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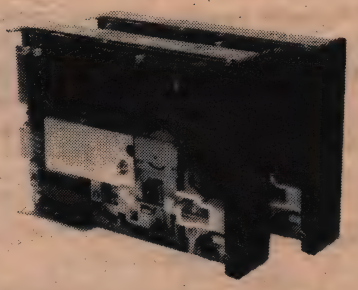

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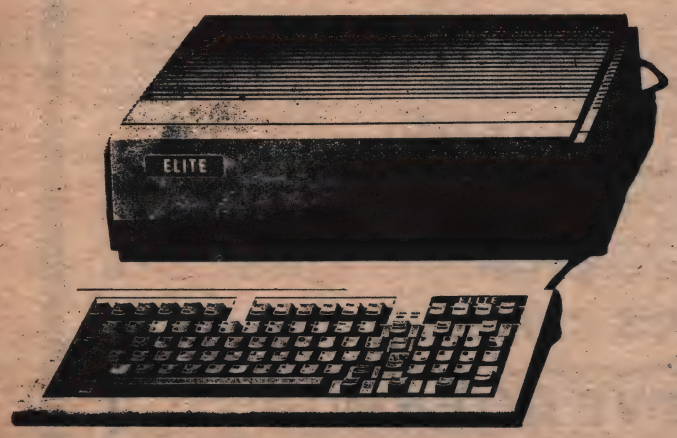

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The SmartCartridge is a terrific way for a BASIC programmer to store assembly language subroutines, small BASIC programs, and other bodies of information. It's also valuable for storing data in harsh environments. For example, a grade school learning system may require a 10-year-old to carry to school every day data pertinent to his or her progress, such as lesson scores. At the end of the course, the cartridge would be turned into the teacher for evaluation. A cartridge would hold up under a 10-year-old's less-than-gentle handling, but imagine the condition of a floppy disk!

Utility Memory comes with built-in interface programs for operation from BASIC, assembly, and DOS. Custom programming is available.

Utility Memory will reach full production by the first quarter of 1985. Price: $169.99 for 2-K version; 8-K version not immediately available. Prices for custom versions vary.

For more information, contact GSN Computers. 34 State Street, Ossining, NY 10562.

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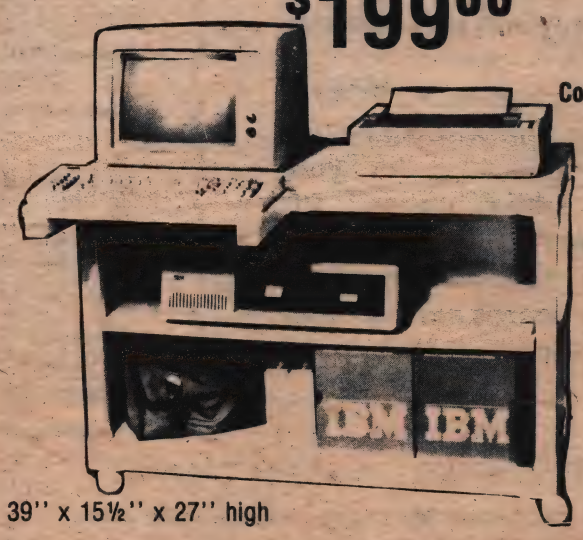

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TRSDOS Topics

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T.CAD for TRS80
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This program is special! If you are into drafting or design, you will flip over it as soon as you get the chance to try T.CAD. Now that I've got that over with, let me say up front that this program is definitely not for everyone. You have to have the need for something like T.CAD to be able to be comfortable with buying it and the equipment necessary to use the program properly. One of my friends who teaches Art and Design is watering at the mouth over T.CAD and will be using it in her classes as soon as the purchases are made.

Generally speaking, you need a high resolution graphics board by Radio Shack or the GRAFYX SOLUTION by Micro-Labs (see other review) to use T.CAD. In specific, the program is set up to run on Houston Instrument plotters models DMP-40, 41, 42, 29, 51 or 52. Dot matrix printout is supported on one version but not recommended. This is a professional "tool" and not a toy. T.CAD is designed for the serious user to aid in design and drafting.

The manual that is provided with the program is good but, in Microdex's words, "not a CAD-tutorial." The manual will get you started and will answer your questions. One of the tricks will be to learn what questions to ask and this can only be learned by firing up the computer and playing with T.CAD until you are familiar with the program. Like many "work-savers," T.CAD probably will make more work at first. Remember when you first set up your computer? Most of the time it would have been quicker to do the work long hand than those first attempts at "computerizing" your work. T.CAD is the same. The first drawing(s) will, in all probability, take more time to do with T.CAD than with pencil and drawing board. The manual warns the user of this and admonishes you not to give up...it gets better. Really! No fooling!

Set aside some time to learn to use T.CAD just as you have the other tools of your trade. You will be glad you did in the long run. If you expect this program to jump up and do all your work for you, forget it and don't waste your money or time. Like all worthwhile efforts this will take a little time and effort on your part but it will pay off in the long run. Microdex recommends several texts in the documentation for those that want more information on CAD methods.

T.CAD or xT.CAD (an extended version with additional features not found in T.CAD) comes with two sample files to allow you to get started using this drafting program. Before you try to actually create a drawing, use these files to utilize the features that are found in T.CAD. Try all of them in order. Be sure to test your graphics board before starting T.CAD. Run whichever test program you have to verify proper operation of the board. Once you are sure the board is O.K., run the T.CAD program.

Right off the bat you need to understand that the computer is representing an "E-size tracing sheet." When you start up, the computer is in "home" position showing a drawing area of 21"x30". The extended version of T.CAD holds two tracing sheets which can be used—one at a time or as overlays one on the other.

There are two cursors—a point and a mark—which can be placed anywhere on the screen by using the arrows. A mark is created by moving the point to the desired position and using <@> to set the mark at the current position. The motion of the point can be set to represent a scale used for the drawing so that 1 tap on the arrow key will cover "1 yard" or whatever scale selected.

Items in the drawings such as circles and arcs are created by using a single key command. The program will "zoom" in or out by increasing the magnification up to 10x and decreasing down to 1x. At 10x you can draw with an accuracy of 1/100 of an inch. At start up, the computer is using a decimal system where 1" on the screen equals 10 "pixels." In xT.CAD you can switch to 12 pixels to the inch or 16 pixels per inch to draw at 1/4" – 1"0". System switching does not affect the drawing.

Editing is the one real advantage of CAD over the conventional drawing methods. No erasers needed here. Parts of drawings can be moved as blocks or saved and reused later. Standard fixtures once drawn and saved need not be drawn again, just called up and placed where you want them. Labeling is just as simple as it would be using a word processor.

All the functions of the program are easily understood and used with practice. There are so many possibilities that it staggers the imagination and may appear to be mind boggling at first but, as I said above, the confusion will clear as you practice with T.CAD.

All the drawing items are created by simple one key commands—</> creates a solid line from MARK to POINT while <.> creates a dotted line, <,> a dashed line and <;> a dot-dash line. <0)draws a circle with the center at the MARK and the radius equal to the distance from MARK to POINT <(< and <)> create arcs.

A grid of dots can be turned on the screen at 1 inch intervals based on the current magnification. If there is already a grid in existence on the screen when you give this command (< + >, a secondary grid will be drawn that divides each inch into as many parts as the current magnification. 4x magnification will produce an inch divided into 4 parts and so on.

Two other functions that I like are SKETCH and PAINT. SKETCH produces temporary lines on the screen that are not put into memory but can serve as "crutches" to help produce a drawing. PAINT allows you to fill in an enclosed area to help you judge what the final product will look like. This cannot be reproduced on the plotter but will show on a dot matrix printer. Be careful of dashed or dotted lines as the paint will leak through into the rest of the drawing. Paint only areas that are enclosed in solid lines.

Blocks can be defined in a drawing and then copied elsewhere or be erased. Using the <symbol causes the drawing to be reduced 1 magnification for each time it is ENTERed and the >symbol enlarges the drawing in the same manner. This produces a "zoom" in or out effect. The screen can be "panned" across and up or down the drawing by using SHIFT ENTER after setting the MARK and POINT to determine direction of the panning action.

SAVING and LOADING drawings is a simple matter using single key commands of <L> for load and <S> for save. I found out the hard way several times that you should SAVE the drawing often to protect your work from accidental loss. Hardcopy on the plotter is just as easy.

The documentation for this program is excellent but as Microdex stated, it isn't designed to be a tutorial. All aspects of the program are covered in the docs and they are very readable. It would be wise to sit down and read them through from cover to cover first. You will save yourself some time and headaches. They are not overly long but are "lean" in order to persuade the user to read them all the way through. Microdex encourages you to call if there is a problem or if you need help. Taking them at their word I did just that and received accurate and friendly assistance via the phone. A manual can be purchased by itself or with a demo disk. The cost of these can be applied to the purchase of the T.CAD program.

This program is a serious tool for the professional and is not intended as a play toy. It does an excellent job of assisting in preparing accurate and clean drawings. After being used for a while it will certainly save time—particularly where drawings have to be repeated or parts of drawings reused. Students that have gone to work in architecture have all come back to tell of the CAD programs that they are using in the profession. Obviously CAD is here to stay and T.CAD looks as if it will stay as well.

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ALLWRITE For The Model 4

by Lon Andrews

"Reads a 25,000 character file from disk in SIX SECONDS. Outruns the fastest microprinter. Footnotes! Produces a Table of Contents and Index! Multiple Columns! Variable pitch within the document!" and much, much more. After reading the ads I was tempted to add "and jumps tall buildings in a single bound!" ALLWRITE for the TRS-80 sounded like it would do everything but look up the reference materials for your paper. Too good to be true was the first reaction I had to the promotional materials. Either way I had to see for myself so I put in the order for the program and sat back and waited for it to show up.

When the package arrived, I sat down to read the documentation before even booting the program. As soon as I started reading, I knew that I was in for a new experience. The authors tell you up front that if you have not used "NEWSCRIPT" or an IBM "mainframe" word processor before that you need to read and use the first three (out of a total of nine) chapters to get started. If you have been using another word processor, they ask you to approach using ALLWRITE as if you know nothing about word processing. They also ask that you keep an open mind and withhold judgment until you get used to ALLWRITE's way of doing things. "Open Mind" nailed me to the wall as this is one of the phrases that I use when I begin to present a difficult or controversial subject in my lectures. I can just hear some of my students saying "now let's see if he practices what he preaches."

To begin with, the documentation is 338 pages long and I did not like it at all. I found myself wandering and wondering while I tried to read it. The organization left a lot to be desired as I went through it several times. My manual looks like a very old copy of one of "those" magazines that are passed around from person to person—dog-eared, tattered, and lots of notes and underlining mar the pages. I need a new one already. Wait a minute! I thought I said that I didn't like this text. By golly, it grows on you as you use it.

It should be plain to anyone that I had problems getting started with this program. When I go through a program for review, I try to pick out the features that I like least as well as those that I like best, and present both in the review. I was finding a lot that I did not care for as I tried to implement ALLWRITE and produce some documents. It was not until I began to really use the program that I began to see the beauty of it. Beauty is a good word to use to describe this word processor. I am not a NEWSCRIPT user so I had to "unlearn" as well as learn as I went along. For me, it was a long haul since I had very firmly entrenched habits and because of this made a lot of mistakes.

ALLWRITE does all of the tasks that you need accomplished by a word processor. If I tried to list them all in the review, the COMPUTER SHOPPER would be a lot longer this month. Suffice it to say if you want it done, ALLWRITE will probably do it for you. The program does so much that it is, more than likely, more word processor than a lot of users will ever need.

ALLWRITE functions on the following disk operating systems: DOSPLUS 3.3, 3.4, 3.5, 4.0 (Models I, III LNW), DOSPLUS IV (Model 4). LDOS 5.1 and up (I, III, MAX-80, LNW). MULTIDOS (I, III and LNW). NEWDOS/80 Version 1 (I and LNW). NEWDOS/80 Version 2, 2.5 (I, III and LNW), NEWDOS 2.1 (I and LNW). TDOS 3.4 (I, III and LNW). TRSDOS 2.3 (I). TRSDOS 1.2, 1.3 (III). TRSDOS 6.0 and up (4). Integration is provided for ELECTRIC WEBSTER by Cornucopia (see October '84 Computer Shopper) and DOTWRITER by Prosoft.

The program comes on a double-sided disk for the Model 4. One side has a copy of TRSDOS 6.x and some of the ALLWRITE files. The other has a copy of DOSPLUS IV and the rest of the ALLWRITE files. There are 18 files provided for your use. Some are optional, several are samples and a couple are used only once during installation. The actual process of installation of ALLWRITE is somewhat involved but presents no problems if you follow directions. Between the documentation and the prompts in the program, it is quickly set up for your use. Once installed ALLWRITE is set for your printer(s)—up to three—and your computer system. Don't forget to backup your disk once you have installed ALLWRITE.

When you boot the program you are asked for a filename.

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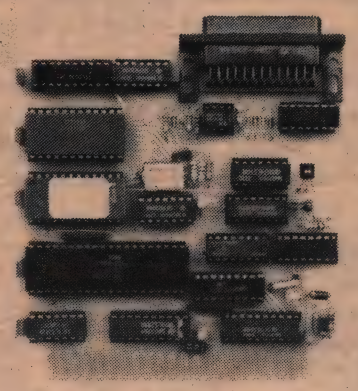
MIRAC RS232



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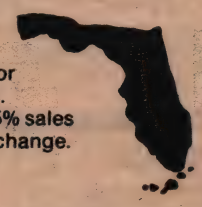

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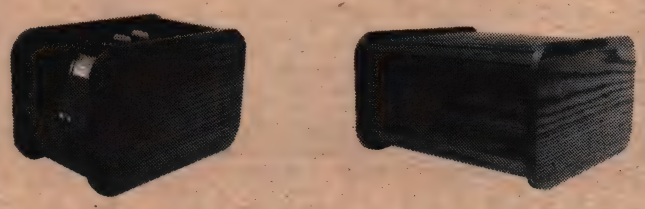

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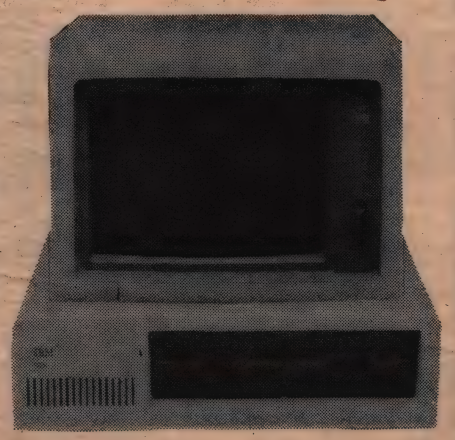

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Continued from page 117

From this point, you are able to look at the directory of any disk in your system. This is a big help if you have a lot of files that you work on from time to time. Once you have entered the filename, ALLWRITE presents you with the loaded document or a blank screen if it is a new document. Format commands are placed on "control word lines" using the semi-colon as the first character on the line at the left edge of the screen. There are only seven control words to be used. "CE" for center, "SK" for skip a line, "PP" to start a new paragraph, "PA" to start a new page, "IN" for indent, "FO" for format and "PI" for pitch. Three pairs of emphasis marks serve to control expanded print, boldface, and shadow print. Most of the commands in ALLWRITE are mnemonics that are easy to remember.

"CLEAR" or "F1" is used as the control key in ALLWRITE. I would prefer the "CONTROL" key on the Model 4 but "CLEAR" has been used on others so much that it is almost automatic to reach for it. DELETING uses "CONTROL" "W," "L," "S" and "P" for Word, Line, Sentence and Paragraph delete. INSERTING is handled by turning on the insert mode and typing in what is to be inserted or by using a single character insert.

"BREAK" serves as the command key to allow you to use functions such as "STATUS," "DIR," "SCREEN PRINT," "WHOOPS," "SAVE," "HELP," "KILL," "NEW" and "QUIT." Most of these are easily understood. "WHOOPS" caught my attention right up front. In reality, it serves to cancel recent changes that haven't scrolled off the screen. Once the line has scrolled off the screen, the changes are not changed by "WHOOPS." STATUS provides a screen that shows characters used and left to be used, a word and line count, screen width, which printer is being used, the number of changes since last saved to disk, filenames for the current, last and next file and the search and replace strings. The program can be set to AUTOSAVE to disk at a specified number of character changes.

HELP produces a menu of the HELP file that answers many questions on various operations in ALLWRITE. This is a valuable tool for use in a word processor that has as much to offer as this one does. There are twenty-two user definable keys that hold up to twenty-two key strokes.

Another feature that I like is the multiple column ability. By using a format command you can have up to sixteen columns arranged automatically by ALLWRITE. These can be balanced or unbalanced columns and you can change the number of columns at will. This feature makes newsletters fun!! The formatting is done during the printing process. No reverse line feeds are used as each line is printed across the page no matter how many columns are used. There is a wait as the formatter prepares the first page but then the formatter stays ahead of the printer.

Footnoting is also done by the program. The footnote format is preset and as you are entering text, you enter the footnote right in the body of the text preceded by a control word ";FN" and followed by ";FN END." The program moves the footnote to the proper location during formatting for printing and inserts the proper number in the body of the text that will either be super scripted or enclosed in parentheses depending on your printer capabilities. Table of Contents and Index entries are handled in much the same manner and can be printed as separate files. The author has included in the documentation some excellent information concerning entries in the Index and Table of Contents.

If you are using a 128K, Model 4 ALLWRITE has another feature that will interest you. The upper 64K is divided into two banks of 32K each. These can be addressed with the "AREA" command to allow you to edit several documents at the same time. By using the "AREA" command, you can switch back and forth between banks.

Included with the software are several "cue cards" that will fit in front of the keyboard and below the screen. These cards serve as cheat sheets to help you with the commands and pre-programmed soft keys. With 79 commands for the text formatter and 36 for the text editor, it helps to keep this card in sight while you are working. Keys 1 through 0 are prededicated to provide quick use of several functions. For instance, "CONTROL 1" produces the command for a new paragraph rather than using ";PP." Others are new page, center, underline, boldface, status, helphard space, screen print, exit to DOS, link to next or preceding files, integration for Electric Webster and Dotwriter, and two formatting options that allow printing or screen viewing of the document.

Please understand that there is a lot to ALLWRITE that I have left out of this article. There is just too much to cover all at one time. If you are experienced in using a word processor, you will find that there is very little, if anything, left out of ALLWRITE. Some things are done differently but they are done. I am used to an instant response when I call for printing and with on screen formatting as I enter data. With ALLWRITE, this is accomplished before printing so there is a wait for the first page. No problem—just a little different. I haven't even mentioned the form letter capabilities, search and replace, block operations, tabbing (a neat feature with this program), linking files or imbedding print commands. There is just so-o-o much to look at. You need to really read the documentation several times to even become familiar with what is there to use. There is a section at the end of the text with hints on using a word processor that is well worth reading. At first it tends to overwhelm the reader but the manual grows on you, as I said earlier. Don't let first impressions make your final decision. The authors knew what they were doing when they asked for an open-minded approach.

PROSOFT offers support to registered owners of ALLWRITE. If you call for help, expect to be asked for your serial number that is displayed every time you boot up the program. I did call to ask a question and was given polite and prompt answers to my questions. I did not bother to mention that I was reviewing the program. In talking to them, I was impressed with the help given. The program is not protected against backup or copying and they do have a problem with piracy. They spoke of the various print fonts available for use with ALLWRITE by integrating DOTWRITER.

ALLWRITE is a fine word processor. I could find very little that was not to my liking. This program can be used to produce large documents, even complete books, by using all of its capabilities. If there is a problem, it would be simply that this is a whale of a program...perhaps more than many would need for their use. I am sure that it is and will get a lot of professional use in offices and by writers needing the capabilities offered by ALLWRITE.

ALLWRITE for the Model IV. $199.95. PROSOFT, Box 560, No. Hollywood, CA 91603. (818) 764-3131. (800) 824-7888, op 422...order line.

CONV 3 To 4

by Lon Andrews

Educational Micro Systems Inc. has produced another fine conversion program (see December Computer Shopper - Conv 3 to 2000) that soothes away the pains of changing from the Model III to the Model 4. Radio Shack discontinued the Model III in 1983 and replaced it with the Model 4. Sure the programs for Model III will run on the Model 4 in the 3 mode but they do not take advantage of the capabilities of the newer model. The Model 4 runs faster and has an enhanced BASIC.

Conversion from Model 3 DISK BASIC to Model 4 DISK BASIC manually is a time consuming and tiresome process. The examples given in the manual for CONV3TO4 show some of the differences between the two BASIC's.

Model III

```
10 PRINTA$
20 FORI = 1TO20STEP2
30 IFA = BTHEN400
40 NEXTI
```

Model 4

```
10 PRINT A$
20 FOR I = 1 TO 20 STEP 2
30 IF A = B THEN 400
40 NEXT I
```

Inserting spaces as above is just one of the required changes. Since the screen

Continued on page 122

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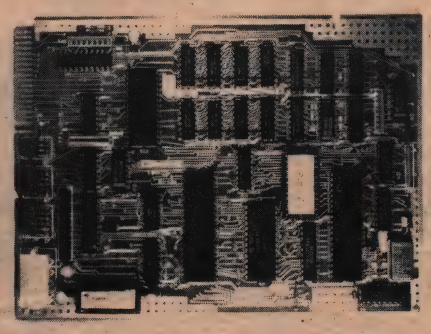

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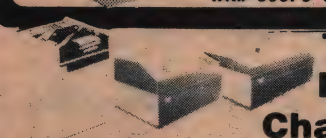

Teletype Model 40 Chain Printers!

Featuring up to 300 lines per minute, these "Hi-Rel" chain printers feature either 80 or 132 print positions, built-in power supplies & acoustic covers and a unique 4 wire interface. All are whole, used & removed from equipment. Print chain not included.

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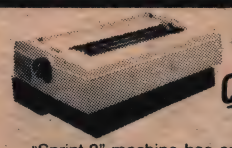
132 column TTY Model 40	$1250.00 ea.
80 column TTY Model 40	$450.00 ea.



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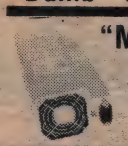

Model A	+5V @ 8A, 12V @ 3A, -12V @ .25A	**$29.**	+5V @ 6A, -5V @ .5A, +12V @ .5A	Model B

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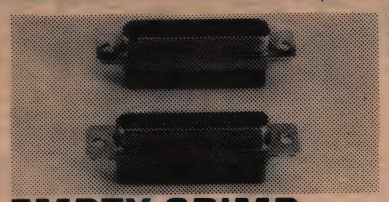
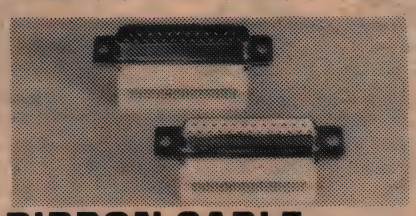


EMPTY CRIMP SHELLS

PART #	PRICE/QTY 1-49	50-99	100-UP
C9P	0.86	0.78	0.72
C9S	0.90	0.82	0.75
C15P	0.88	0.80	0.73
C15S	0.92	0.84	0.77
C25P	0.90	0.82	0.75
C25S	0.94	0.85	0.78
C37P	1.04	0.95	0.87
C37S	1.06	0.96	0.88
C50P	1.14	1.04	0.95
C50S	1.20	1.09	1.00



RIBBON CABLE CRIMP ON D CONNECTORS

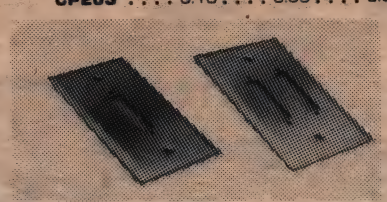
PART #	PRICE/QTY 1-49	50-99	100-UP
IDC-9P	4.00	3.64	3.33
IDC-9S	4.28	3.89	3.57
IDC-15P	4.86	4.42	4.05
IDC-15S	5.24	4.76	4.37
IDC-25P	5.24	4.76	4.37
IDC-25S	5.82	5.29	4.85
IDC-37P	8.22	7.47	6.85
IDC-37S	8.92	8.11	7.43
IDC-50P	19.71	18.40	17.25
IDC-50S	23.87	20.46	19.09

GRAY HOODS

PART #	PRICE/QTY 1-49	50-99	100-UP
GH-9	1.02	0.93	0.85
GH-15	1.04	0.95	0.87
GH-25	1.06	0.96	0.88
GH-37	1.18	1.07	0.98
GH-50	1.32	1.20	1.10

CONTACTS FOR EMPTY CRIMP SHELLS

PART #	PRICE/QTY 1-99	100-999	1000-UP
CP20P	0.08	0.07	0.06
CP20S	0.10	0.09	0.08



RS—232 DB—25 WALL PLATES

metal wall plates

PART #	PRICE/QTY 1-24	25-49	50-UP
WP-1	2.95	2.66	2.36
WP-2	3.45	3.11	2.76

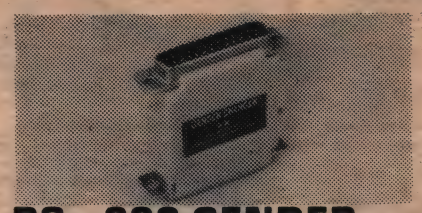
P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
P9P	1.58	1.44	1.32
P9S	2.60	2.36	2.17
P15P	2.10	1.91	1.75
P15S	3.66	3.33	3.05
P25P	2.90	2.64	2.42
P25S	4.38	3.98	3.65
P37P	4.30	3.91	3.58
P37S	8.18	7.44	6.82
P50P	5.50	5.00	4.58
P50S	10.70	9.73	8.92

CONTACT EXTRACTOR TOOL

extracts contacts from D crimp shells

PART #	PRICE/QTY PRICE
EX-1	2.75 EACH



RS—232 GENDER CHANGERS

PART #	PRICE/QTY 1-9	10-UP
AGC-M	9.95	7.95
AGC-F	9.95	7.95

P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
R9P	2.54	2.31	2.12
R9S	2.60	2.36	2.17
R15P	2.98	2.71	2.48
R15S	3.10	2.82	2.58
R25P	3.72	3.38	3.10
R25S	3.00	2.73	2.50
R37P	4.70	4.27	3.92
R37S	4.90	4.45	4.08
R50P	9.72	8.84	8.10
R50S	11.00	10.00	9.17

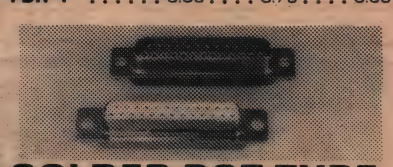
CRIMPING TOOL

for crimping D series contacts

PART #	PRICE/QTY PRICE
CT-1645	79.95 EACH

D-SERIES HARDWARE

PART #	PRICE/QTY 1-49	50-99	100-UP
MDH-1	0.55	0.45	0.35
FDH-1	0.85	0.75	0.65



SOLDER POT TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
9P	1.44	1.31	1.20
9S	1.94	1.76	1.62
15P	1.96	1.78	1.63
15S	2.60	2.36	2.17
25P	2.20	2.00	1.83
25S	2.80	2.55	2.33
37P	4.00	3.64	3.33
37S	5.20	4.73	4.33
50P	5.08	4.62	4.23
50S	7.80	7.09	6.50

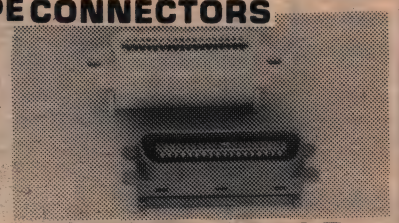
BLACK AMP HOODS

PART #	PRICE/QTY 1-49	50-99	100-UP
AH—25	1.30	1.18	1.08

CENTRONICS TYPE CONNECTORS

SOLDER POT TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
CEN-36P	4.00	3.64	3.33
CEN-36S	4.20	3.82	3.50
CEN-36SCM	3.50	3.18	2.92



RIBBON CABLE CRIMP ON

PART #	PRICE/QTY 1-49	50-99	100-UP
IDC-36P	6.00	5.45	5.00
IDC-36S	7.90	7.18	6.58

SHEILDED HOOD

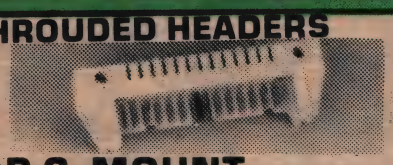
PART #	PRICE/QTY 1-49	50-99	100-UP
SH-25	1.35	1.23	1.13

RIBBON CABLE CONNECTORS

IDH SHROUDED HEADERS

P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10R	0.80	0.72	0.64
IDH-20R	1.20	1.08	0.96
IDH-26R	1.50	1.35	1.20
IDH-34R	2.00	1.80	1.60
IDH-40R	2.40	2.16	1.92
IDH-50R	2.95	2.66	2.36
IDH-60R	3.86	3.47	3.09

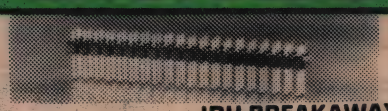


P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10	0.80	0.72	0.64
IDH-20	1.15	1.04	0.92
IDH-26	1.50	1.35	1.20
IDH-34	1.95	1.76	1.56
IDH-40	2.30	2.07	1.84
IDH-50	2.85	2.57	2.28
IDH-60	3.45	3.11	2.76

.1 x .1 spacing, gold plated pins

IDH BREAKAWAY HEADER STRIPS



P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10B	0.30	0.27	0.25
IDH-14B	0.42	0.38	0.35
IDH-16B	0.48	0.44	0.40
IDH-20B	0.60	0.55	0.50
IDH-26B	0.78	0.71	0.65
IDH-34B	1.02	0.93	0.85
IDH-40B	1.20	1.09	1.00
IDH-50B	1.50	1.36	1.25
IDH-60B	1.80	1.64	1.50
IDH-80B	2.40	2.18	2.00

P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10BR	0.38	0.35	0.32
IDH-14BR	0.53	0.48	0.44
IDH-16BR	0.61	0.55	0.51
IDH-20BR	0.76	0.69	0.63
IDH-26BR	0.99	0.90	0.82
IDH-34BR	1.29	1.17	1.08
IDH-40BR	1.52	1.38	1.27
IDH-50BR	1.90	1.73	1.58
IDH-60BR	2.28	2.07	1.90
IDH-80BR	3.04	2.76	2.53

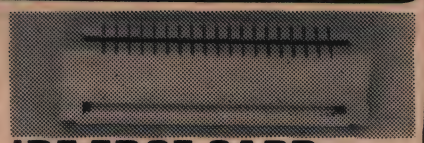
dual row .1 x .1 spacing, gold plated pins

ALTEX ELECTRONICS

RIBBON CABLE CRIMP ON CONNECTORS

IDS SOCKET TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDS-10	1.15	1.04	0.92
IDS-14	1.35	1.22	1.08
IDS-16	1.45	1.31	1.16
IDS-20	1.50	1.35	1.20
IDS-26	2.40	2.16	1.92
IDS-34	2.90	2.61	2.32
IDS-40	3.50	3.15	2.80
IDS-50	4.25	3.83	3.40
IDS-60	5.80	5.22	4.64

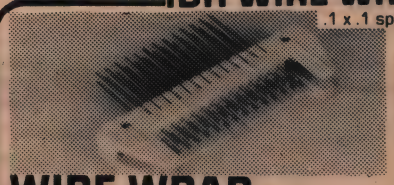


IDE EDGE CARD TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDE-10	1.90	1.71	1.52
IDE-14	2.00	1.80	1.60
IDE-20	2.25	2.03	1.80
IDE-26	2.65	2.39	2.12
IDE-34	2.95	2.66	2.36
IDE-40	3.50	3.15	2.80
IDE-50	4.25	3.83	3.40

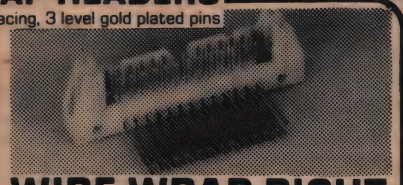
IDH WIRE WRAP HEADERS

.1 x .1 spacing, 3 level gold plated pins



WIRE WRAP STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10W	1.50	1.35	1.20
IDH-20W	2.55	2.30	2.04
IDH-26W	3.20	2.88	2.56
IDH-34W	3.75	3.38	3.00
IDH-40W	4.50	4.05	3.60
IDH-50W	5.50	4.95	4.40



WIRE WRAP RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10WR	2.45	2.21	1.96
IDH-20WR	2.60	2.34	2.08
IDH-26WR	3.25	2.93	2.60
IDH-34WR	3.80	3.42	3.04
IDH-40WR	4.65	4.19	3.72
IDH-50WR	5.55	5.00	4.44

IDP PLUG CONNECTOR

mates with IDS type connectors

PART #	PRICE/QTY 1-49	50-99	100-UP
IDP-20P	3.95	3.16	2.53
IDP-34P	4.95	3.96	3.17
IDP-50P	5.95	4.76	3.81

IDD DIP PLUG CONNECTOR

for pluging into IC sockets

PART #	PRICE/QTY 1-49	50-99	100-UP
IDD-14	1.30	1.17	1.05
IDD-16	1.65	1.49	1.34
IDD-24	2.25	2.03	1.82
IDD-40	3.90	3.51	3.16

RIBBON CABLE ASSEMBLYS

D-SERIES RIBBON CABLES

PART #	PRICE
9P-9P	8.00 + .18 per foot
9P-9S	8.28 + .18 per foot
9S-9S	8.56 + .18 per foot
15P-15P	9.72 + .30 per foot
15P-15S	10.10 + .30 per foot
15S-15S	10.48 + .30 per foot
25P-25P	10.50 + .50 per foot
25P-25S	11.10 + .50 per foot
25S-25S	11.30 + .50 per foot
37P-37P	16.44 + .74 per foot
37P-37S	16.95 + .74 per foot
37S-37S	17.80 + .74 per foot

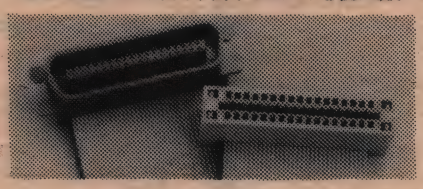
GENDER MENDERS

PART # GM-25	PRICE
GM-25	22.50 + .50 per foot

25 pin RS-232 cable with a male and female connector on each end.

CENTRONICS TO IDS-40 RIBBON CABLES

PART #	PRICE
36P-40S	9.50 + .72 per foot



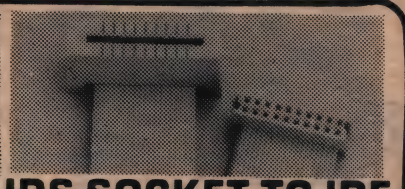
CENTRONICS TO IDE-34 RIBBON CABLES

printer cable for TRS-80 computers

PART #	PRICE
36P-34E	10.25 + .68 per foot

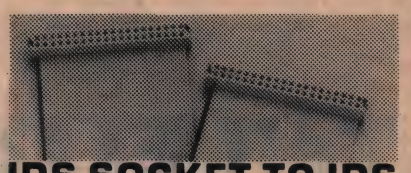
CENTRONICS 36 PIN RIBBON CABLES

PART #	PRICE
36P-36P	12.00 + .72 per foot
36P-36S	13.45 + .72 per foot
36S-36S	15.90 + .72 per foot



IDS SOCKET TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10S-10E	3.05 + .20 per foot
14S-14E	3.35 + .28 per foot
20S-20E	3.75 + .40 per foot
26S-26E	5.05 + .52 per foot
34S-34E	5.85 + .68 per foot
40S-40E	7.00 + .80 per foot
50S-50E	8.50 + 1.00 per foot



IDS SOCKET TO IDS SOCKET RIBBON CABLES

PART #	PRICE
10S-10S	2.30 + .20 per foot
14S-14S	2.70 + .28 per foot
16S-16S	2.90 + .32 per foot
20S-20S	3.00 + .40 per foot
26S-26S	4.80 + .52 per foot
34S-34S	5.80 + .68 per foot
40S-40S	7.00 + .80 per foot
50S-50S	8.50 + 1.00 per foot
60S-60S	11.60 + 1.20 per foot

IDD DIP PLUG TO IDD DIP PLUG RIBBON CABLES

PART #	PRICE
14D-14D	2.60 + .28 per foot
16D-16D	3.30 + .32 per foot
24D-24D	4.40 + .48 per foot
40D-40D	7.80 + .80 per foot

IDE EDGE CARD TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10E-10E	3.80 + .20 per foot
14E-14E	4.00 + .28 per foot
20E-20E	4.50 + .40 per foot
26E-26E	5.30 + .52 per foot
34E-34E	5.90 + .68 per foot
40E-40E	7.00 + .80 per foot
50E-50E	8.50 + 1.00 per foot

PARALLEL PRINTER CABLES

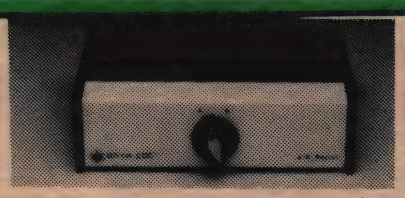
IBM PC TO PARALLEL PRINTER

PART #	PRICE	10-UP
PPC-301-5	19.95	16.95
PPC-301-10	24.95	19.95

SERIAL/PARALLEL DATA TRANSFER SWITCHES

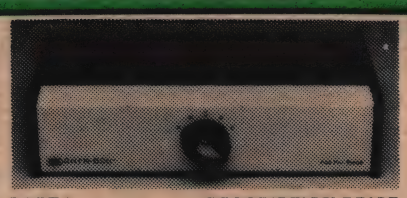
PART #	DESCRIPTION	PRICE
AB-25	RS-232 SWITCHBOX	88.00

switches all 25 lines; two positions for interfacing; two printers to one computer or one printer to two computers



PART #	DESCRIPTION	PRICE
AB-36	PARALLEL SWITCHBOX	138.00

switches all 36 lines two positions for interfacing two computers to one printer or two printers to one computer.



PART #	DESCRIPTION	PRICE
AB-5	RS-232 5 PORT SWITCHBOX	149.95

switches 12 lines 5 positions for connecting any one of five terminals to one serial modem or five parallel printers to one computer or vice versa.

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TRSDOS Topics
Continued from page 118

dimensions are different each PRINT@ address in Model 3 must be recalculated to meet the requirements of the Model 4. Conditional NEXT statements are not acceptable to the Model 4 and some other Model 3 instructions are not supported at all in Model 4 BASIC. A great deal of the conversion has been made automatic and where the computer does not make the change over the condition is flagged for manual attention.

In order to use CONV3TO4 first make a working copy of the program on your Model 4 DOS. You will need to save the Model 3 program in the ASCII form with TRSDOS 1.3. EMS provides a simple BASIC program to run with the ASCII program you have saved. It checks line length of the program for those lines that will be too long to be converted to the Model 4 BASIC. These lines will be flagged and you can split them before proceeding further. Run the ASCII version after you have SAVEd it to see if you get any "direct statement in file" errors. If so load the original BASIC program, split the bad line, and SAVE it in ASCII again.

Throughout all of this procedure be sure to keep your program names straight. Don't confuse the ASCII version with the BASIC version. Use TRSDOS 6.x to CONV the TRSDOS 1.3 program to your Model 4 disk. At this point you have an ASCII format file of your original program on a Model 4 disk. You are now ready to convert this program to a Model 4 BASIC program.

Power up in the Model 4 mode with your TRSDOS disk and the ASCII file in drive 0. Type BASIC and press <ENTER>. Insert your working copy of CONV3TO4 in drive 1 and type:

RUN"CONV3TO4/BAS:1"
and press <ENTER>

After the CONV Menu is displayed you can remove the disk from drive 1. Make sure the printer is on and adjusted at this point (if you are using one). If you are going to SAVE the CONVerted file to disk put a formatted disk in drive 1 unless you are going to SAVE it to drive 0 on the DOS disk.

The MENU offers the following options:

A. Display errors on SCREEN. Mostly for those without printers.

B. Display Mod III lines on SCREEN. For those without printers.

C. Display Mod 4 lines on SCREEN. For those without printers.

D. List errors on PRINTER.

E. List Mod III lines on PRINTER. Assists with manual corrections.

F. List Mod 4 lines on PRINTER. Assists with manual corrections.

G. PAUSE after each error condition. For those without printers.

H. SOUND BELL after each error condition. For those without printers.

I. SAVE converted Mod 4 version to disk.

J. Insert line feed after each ":".

K. Insert line feed before IF, THEN, ELSE.

L. Remove REM's and comments from Mod 4 version.

After selecting the options that you desire they are presented to you again for your confirmation. If you are convinced that the selections are what you want you will then be prompted to enter a filespec for the converted file so that it may be saved to disk. As soon as you <ENTER> the filespec the CONV3TO4/bas program executes the conversion. Sit back and watch.

When the program is finished you have a converted Model III program that will probably need some finishing touches by you. Flagged errors need to be corrected manually. These errors will in all probability be explained in the manual, at least I haven't encountered one that isn't covered by the author. Once the corrections are made, SAVE the program and you are ready to go.

As with the 3 to 2000 conversion Educational Micro Systems has done a beautiful job on the documentation for this program. It serves as a text in the differences between Model 3 and Model 4 BASICs. I have learned a lot about both BASICs just by reading the documentation. CONVERTing a program taught me even more. Covered in the documentation for your use in conversion you will find a section on CONV3TO4 Error Messages, where all the errors that you might have to contend with are explained and how to handle them is covered as well at the same time.

There is also a section covering suggestions for better conversions. Little things to make your life easier while using this program. Model III PEEKS and POKES are discussed and ways to get around them are presented. Several replacements for the more common Model III "CMD" statements are given as well as a "Mod 4 bubble sort" to replace "CMD O" for short sorts.

Other differences that are more subtle are also presented. INPUT statements, KEYBOARD TYPE-AHEAD, TIME DELAY differences, MEMORY SIZE and PRINTER STATUS are some of these differences that I had never even thought about until now. One of the best tables in the text is the one that compares Mod III and Mod 4 ERROR CODES for BASIC and DISK errors.

The program works well and the documentation is excellent. What else can I say? Maybe...Try it you'll like it!

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Three Handy Utilities From LSI

by Hardin Brothers

For serious computer programmers and users, the availability of useful, dependable utility programs for a computer is often at least as important as the availability of application programs. If you have to write your own utilities, or constantly work around limitations of your computer and operating system, your computer will not be nearly as productive as it should be.

There are several utility packages available for the Model 4, and many of the most useful and dependable come from Logical Systems Inc., the authors of the Model 4's TRSDOS 6 operating system. This month I'll describe three of the packages available from them.

Overdrive

No matter how fast a system runs, there will be users who are impatient for it to go faster. TRSDOS 6.2 is much faster than earlier versions of the Model 4 DOS, but you still have to wait for files to be transferred to and from disk and, for large files, the wait can be aggravating. One way to speed up your Model 4 is with a simple-to-use utility called Overdrive.

Overdrive requires a Model 4 with 128K of RAM running TRSDOS 6.2 (not an earlier version). When you install it by typing "OD" from TRSDOS Ready, it performs two functions. First, it moves system modules 1 through 5 and 9 through 12 to one of the alternate memory banks. From then on, system calls to those modules will not need to access your system disk.

Those modules run most of your TRSDOS system except when you need to perform a library command or run a TRSDOS utility program. Normally, each time TRSDOS needs a system module, that module must first be loaded into memory from your system disk. Without using Overdrive, you can avoid these accesses of the system disk either by using the SYSTEM (SYSRES) command or by moving the entire system disk to memory with Memdisk. Overdrive takes care of doing all that for you.

But Overdrive doesn't stop at moving the major system modules to memory. It also allows you to specify up to two drives that you want to have buffered. From then on, all files read from that drive will be moved a track at a time into an alternate high memory bank, instead of being read a sector at a time into normal memory. All sequential reads from that drive will be much faster, including program access to sequential files (or random files used sequentially) and loading or running programs from that drive.

Overdrive works easily and seems to be completely dependable. Using it is like super charging your Model 4's disk drives. I use Overdrive often, especially when I am writing, and usually don't think much about it. But when I forget to install Overdrive at the beginning of a writing session, I suddenly realize how much it speeds up the system as I impatiently wait for files to be loaded from disk.

LSQFB

Because the TRSDOS Backup utility supports so many different functions and types of disks--single and double sided, single and double density, 35 to 80 tracks, hard disks, complete backups, backup by date, backup by partspec, etc.--it insists that the destination diskette be formatted before a backup can be performed. However, often you will want to backup one disk to another completely, and the extra time required to format a disk before a backup becomes an aggravation.

If you want to create a mirror image backup of an entire disk onto another disk with the same number of sides, tracks, and the same density, LSQFB makes the job much easier and quicker. LSQFB (Logical System's Quick Format and Backup) is designed only for mirror-image backups: from one floppy diskette to another, identical floppy diskette.

LSQFB goes through several distinct steps. First, it logs in the source disk and determines the type of format needed. Then, track by track, it formats the destination disk, reads that track from the source disk, writes the track to the destination disk, and verifies the track on the destination disk. You can turn off the verification process if you wish, or specify a verification of the entire destination diskette at the end of the backup session. You can also tell LSQFB whether you wish to copy unallocated tracks from the source to the destination diskette, or just those tracks that are in current use.

Any operating system worthy of its name must have utilities to do all the neat things people need that were not designed into the DOS when it was written. Here, Hardin Brothers looks at utility programs for TRSDOS 6.2. You will really want to own these programs once you know about them. These are straight from the "horses mouth" since they come from Logical Systems who wrote TRSDOS 6.2 in the first place.

By combining the formatting, backup, and verification process, LSQFB saves a great deal of time. It took my computer less than a minute to back up a 40-track, double density, single-sided disk with LSQFB. The same process takes well over two minutes, plus the time required to type the commands and answer the prompts, with a normal TRSDOS Format and Backup.

LSCOMP

Included on the same disk as LSQFB is another utility called LSCOMP. This utility will compare two files, parts of two files, two complete diskettes, or parts of two diskettes to determine if they are identical. If they are, the program reports that all is well and ends. If the files or diskettes are not identical, the program shows you where the differences occur so that you can correct the problem or find the differences between two files.

Like the other LSI utilities, this program is easy to use. You merely specify the two files or two disks you wish to compare and the program takes care of the rest of the work. You may send the output either to the screen or to your printer. You'd probably choose the screen if you are using LSCOMP to verify that a file has been copied correctly or that your backup disk does, indeed, have a copy of the most recent version of your data files. However, if you are interested in finding the changes that have been made to a program file since the last time it was compiled, you probably will want to have the differences sent to your printer.

Both LSQFB and LSCOMP are easy to use. I find the first more worthwhile than the latter, partly because I usually do a fairly good job of keeping track of the versions of programs and articles I write. For other people, though, LSCOMP might prove to be the more useful of the two programs.

DiskDISK

DiskDISK is a very unusual utility program. Its purpose is to create a logical disk drive inside a file on a physical disk drive. That description, however, does little to explain how DiskDISK is used.

A Model 4 TRS-80 may have up to eight logical disk drives operating at any one time. The hardware is restricted to a maximum of four floppy drives and two hard drives (depending on the hard drive controller and software). You may have Memdisk operating as another logical driver, either in memory banks 1 and 2, or in normal high memory. Also, the TRS-80 is capable of segmenting hard drives into smaller logical drives.

The definition of a logical disk drive can get rather involved, but basically it is any data structure that can be used by TRSDOS to store files and which has a directory. Normally, each floppy disk drive is seen by the system as a logical drive, and normally the floppy drives are numbered from 0 to 3.

Assuming that you don't already have 8 logical drives running on your system (which would be quite possible if you had four floppy-disk drives and a hard disk segmented as four separate drives), you can use DiskDISK to create a new drive. Once created, that drive will have a directory like any other, and will show up in the chart displayed by the TRSDOS Device command.

The only thing confusing about this is that you don't have a new physical disk drive you can see, but TRSDOS thinks you've just added a new drive to your system. Where is this new drive? It's inside a file on a diskette on one of your other drives, or somewhere inside your hard drive.

You could have several reasons for wanting to add a new logical drive. First, your physical drives may vary in capacity from less than 100K bytes on an old single-sided, single-density drive to several million bytes on a hard disk. There may be times when you want to make a mirror-image (or exact) backup of the smaller drive onto the larger one. With DiskDISK, you can backup an entire drive into a single file on a larger drive.

Also, you may want to keep a library of short programs, data files, or subroutines. If you have several short, related programs you may not want them all to appear in a normal directory but you may not wish to keep them on a separate

Continued on page 126

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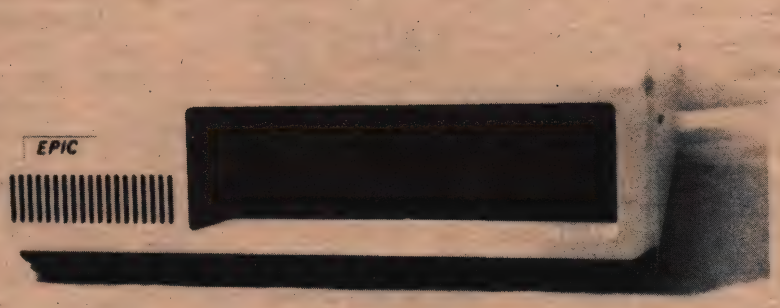

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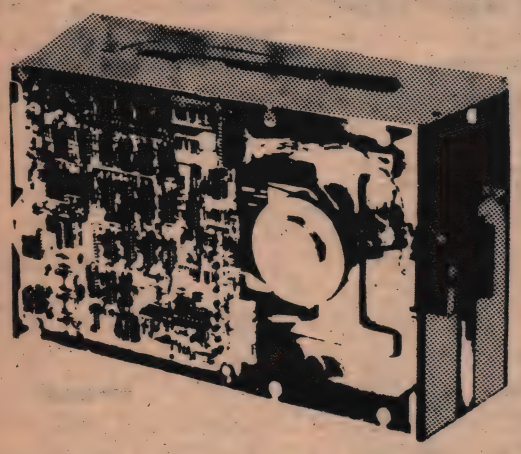

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Three Handy Utilities
Continued from page 123

disk, either. With DiskDISK, those files could all reside inside a single file on a floppy disk.

Also, TRSDOS will allow only a maximum of 256 files per drive. On a floppy disk, you will never approach that maximum (in fact, a floppy disk cannot normally hold that many files). But you could easily put more than 256 short files on a hard disk if only the system would allow it. With DiskDISK, you can.

A TRS-80 with DiskDISK is somewhat similar to an IBM-PC or MS-DOS computer using pathnames. Both techniques are useful for keeping related files together, and both have advantages and disadvantages.

DiskDISK is very easy to use once you decide how much room to allocate on a disk to the new logical drive. First, you run DDFORM/CMD and name a file that will contain the new drive. You need to choose between four types of logical drives. Type 1 holds information in the smallest possible amount of space, allocating a single sector to each granule and 8 granules per logical cylinder or track. A type 1 drive may contain up to 192K bytes of data.

A type 2 logical drive uses 2 sectors per granule and, again, 8 granules per logical cylinder. Though it is less efficient than a type 1 logical drive for storing files, it is the smallest DiskDISK drive that can become a system drive.

The other two possible types are called 5 and 8, and are used to emulate 5" and 8" floppy drives. If you choose to create a type 5 or type 8 DiskDISK drive, you can then specify whether the drive will logically have one or two sides and whether the drive should appear to the system as single or double density (your choice doesn't affect how the DiskDISK file is stored, but does affect how files are stored inside of it). Finally, you need to decide how many logical cylinders your new logical drive should have. A DiskDISK drive may have anywhere from 3 to 96 logical cylinders. Your choices will, of course, determine the total capacity of the DiskDISK drive.

Once you have created the new lgocial drive with DDFORM, you need to link that drive into TRSDOS. You do so by typing 'DD' followed by the drive number you want TRSDOS to use for that logical drive, and the name of the file that contains the drive. For example, if you have a file on physical drive number 1 called DRIVTEST/DSK, and you want that drive to become logical drive number 7, you would type:

DD :7 DRIVTEST/DSK:1

From then on until you disable DiskDISK (which you must do to close the DRIVTEST file), the command DIR :7 will show you the files inside your new logical drive and you can save or retrieve files from it just as you would from any other drive on your system.

Though DiskDISK sounds complex, it is really quite simple to use once you have decided how you want to configure your system. And it gives you a great deal of flexibility storing and saving related files. If you have a lot of partially-filled floppy disks, or if you have a hard disk that needs to be better organized, DiskDISK can make your computing life much easier.

These three utility disks can add a great deal of speed and power to your Model 4 TRS-80. All three seem to run without any problems, and each is backed by LSI's customer service which includes prompt answers to technical questions and support of a special interest group on CompuServe. If any of the three fulfill your computing needs, I recommend highly that you purchase it.

Product Information:
OVERDRIVE—$99
LSQFB and LSCOMP—$49
DiskDISK—$99
All for TRS-80 Model 4 (Overdrive requires 128K and TRSDOS 6.2). From: Logical Systems Inc, 8970 North 55th Street, PO Box 23956, Milwaukee, WI 53223. (800) 248-3535. ●

Hardware Hacking With A Blowtorch!...Build Your Own Custom Computer Accessories

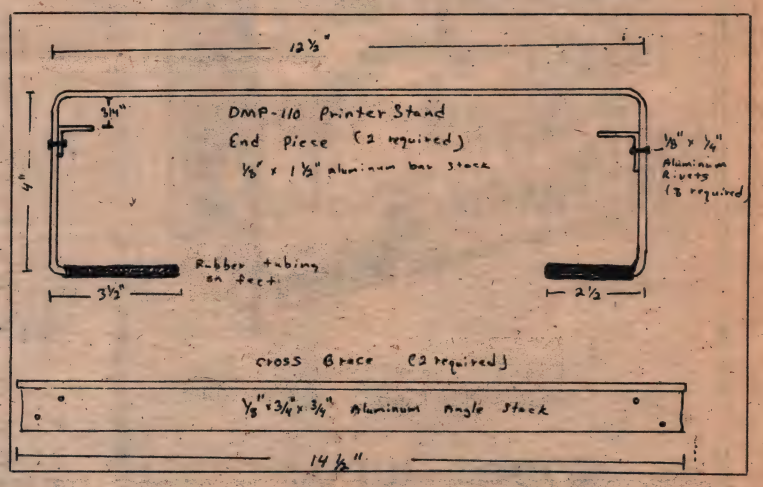
by George M. Ewing

The actual construction project described here is fairly specialized, namely building a tabletop printer stand to fit a Radio Shack DMP-110 dot matrix printer, but the technique employed should work fine for any number of small to medium sized accessories. It should enable the hobbyist with only simple hand tools to duplicate inexpensively not just different sizes of printer stand,

Materials

The model shown was built from Reynolds 1/8" aluminum, bar stock 1-1/2" wide for the end supports and 3/4"x3/4" angle for the cross braces. This material happened to be on hand, but many different sizes of aluminum stock could be substituted, depending on the weight and strength requirements of your particular project. U-channel extrusions or heavy tubing could have been used here in place of the angle stock, for example. The 1/8" stock can be purchased paper supports, custom racks for outboard disk drives, etc.

Continued on page 130



DMP-110 Printer Stand End Piece and Cross Brace

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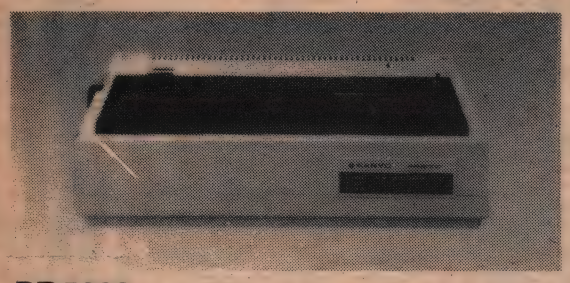

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Hardware Hacking
Continued from page 126

new at hardware stores and building-supply outlets for approximately a dollar a foot, but don't overlook the scrap bins and junk barrels at discount stores. Old extension ladders, screen doors, lawn furniture, panels and chassis from surplus electronic equipment are all good sources of cheap or free scrap aluminum.

Tools

Required tools include a 1/8" drill, either hand or electric, some kind of vise or homemade table-top clamp, a hacksaw, and a pop-rivet gun with a supply of 1/8" aluminum rivets of appropriate length. A small propane torch or gas stove burner is necessary for one of the hot-bending techniques described, and some steel wool and fine sandpaper are needed if the appearance of the finished product is important.

Make a paper sketch of the project before you go out to buy or scrounge your materials. Don't forget to get the actual measurements of the dimensions on the equipment your stand or shelf will support. The 14-1/2" width of this stand, for example, is to allow the rubber sides of the DMP-110 base, which are 14" apart, to be fully supported with a quarter inch to spare on but CRT monitor shelves, roll either side. Be sure to check the exact placement of rubber feet, and to note both the center-to-center dimensions and the diameter. If in doubt, leave a little extra room where possible.

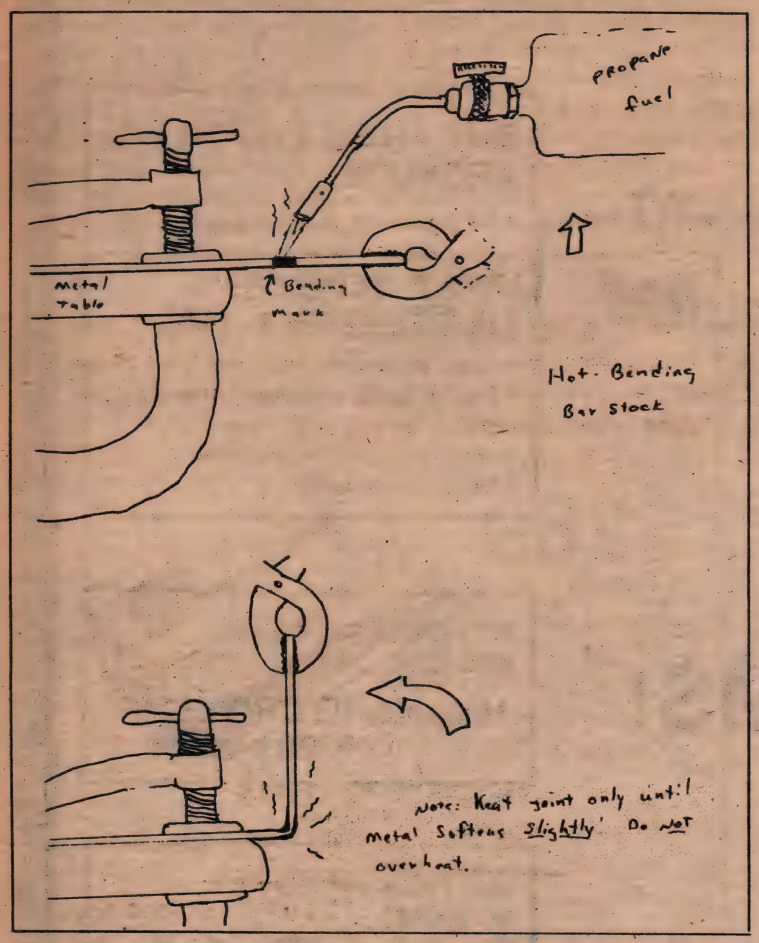
When calculating the amount of stock needed for the end pieces, remember that some length is taken up by the bends themselves, so allow some extra. Two methods of bending flat bar are practical, cold bending with a vise or bending brake, and hot bending with a torch, clamp, and pliers. Hot bending is easier, but permanently softens the temper of the aluminum alloy near the bends, resulting in some loss of strength. This is probably only important for very heavy loads, but should be kept in mind. Whichever technique is employed, the bends on the two identical end pieces should be done the same way, starting at one end of the piece and working progressively toward the opposite end. Make the first bend on both pieces, compare them side-by-side on a table top, then do the second bend on both pieces, check the measurements again, and so on.

After figuring out the dimensions for this stand and allowing a few extra inches to facilitate bending, I cut two 30" pieces from a six foot section of bar. Each piece was clamped to a metal table top with a C-clamp, and the first bend was marked with a permanent felt-tip marker. The marked spot on each bar was heated with the propane torch until the metal just began to soften slightly, then the piece was bent 90 degrees with pliers, checked with a square, and then quenched with cold water. Be careful not to overheat the metal when you do this, or you may weaken it so badly that it will fatigue and crack when bent. Practice on a couple of pieces of scrap first, if possible. When the felt marker ink starts to burn off the surface of the metal, you are getting close to the right temperature.

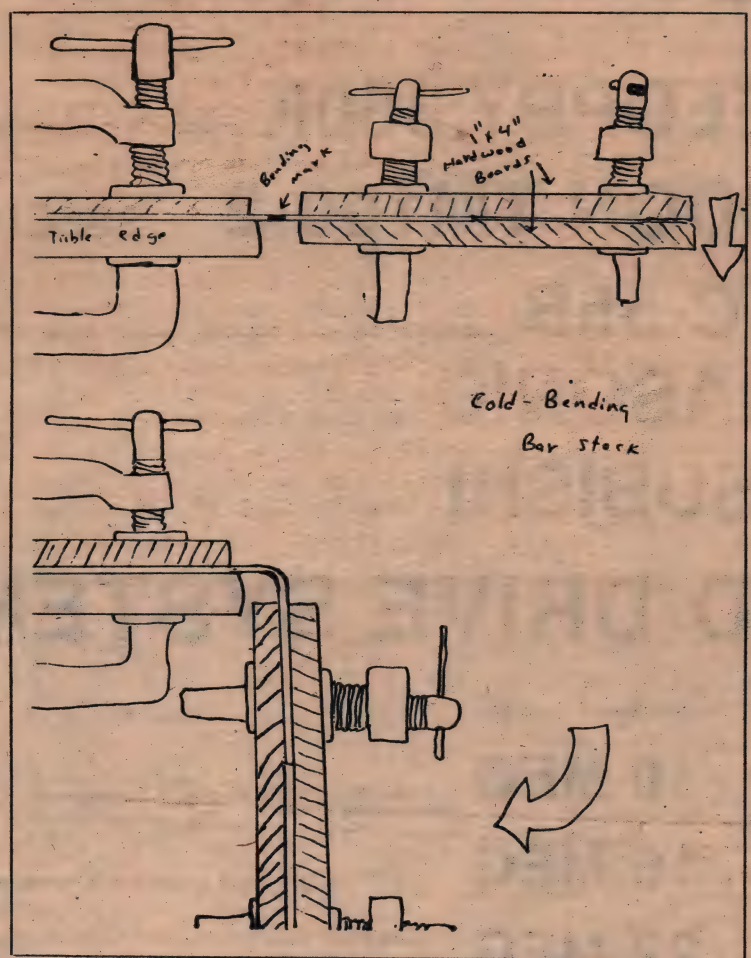
Keep fire safety in mind when doing this. Work outdoors or in a well-ventilated workshop. Have a fire extinguisher and a bucket of water or box of baking soda handy. Insulated welder's or fireplace gloves are a good idea. Be careful!

After the fourth and last bend had been completed on both pieces of stock, they were clamped together and the ends

Continued on page 131


propane fuel
metal table
Bending mark
Hot-Bending Bar stock
Note: Heat joint only until metal softens slightly. Do NOT overheat.

Hot Bending Printer Stand Frame



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Hardware Hacking
Continued from page 130

were trimmed to exact length with a hacksaw. When finished, the sawn ends should be smoothed off with file or sandpaper, and any scratches or pliers-marks left in the metal should be sanded smooth. This should also be done for the cross braces when they are cut to length. The final sanding should be done with 400-grit automotive emery paper or fine steel wool to remove any remaining scratches. You can obtain a deluxe satin finish by etching, or you can buff on a shiny finish with automotive rubbing compound or some other fine abrasive polish. A coat of clear lacquer or acrylic auto polish will keep the finish looking shiny, or you can paint it to match the rest of your system.

As the ends of the two cross pieces are exactly flush with the outside edges of the end pieces when assembled, the length of the braces determines the width of the finished project. Clamp the pieces together with a vise or C-clamp when punching and drilling the holes for the rivets. The rivets should be the correct "grip range" for the total thickness of the aluminum to be fastened, in this case 1/4" for the two stacked 1/8" pieces. You should clean out any burs or fine drill shavings in the holes before attempting to rivet the pieces together, but don't enlarge the holes too much; the rivets should go in with a snug fit. I would recommend that only one rivet, the outside one, be put in each joint initially. Check the assembled frame for squareness before putting in the second four, which will make the frame a lot more rigid. Machine screws, nuts, and lock washers or surplus self-tapping screws could be substituted, but the pop-rivets are more convenient. Use aluminum rivets, not steel ones. It's a good idea not to mix steel fasteners with aluminum structural parts if it can be avoided.

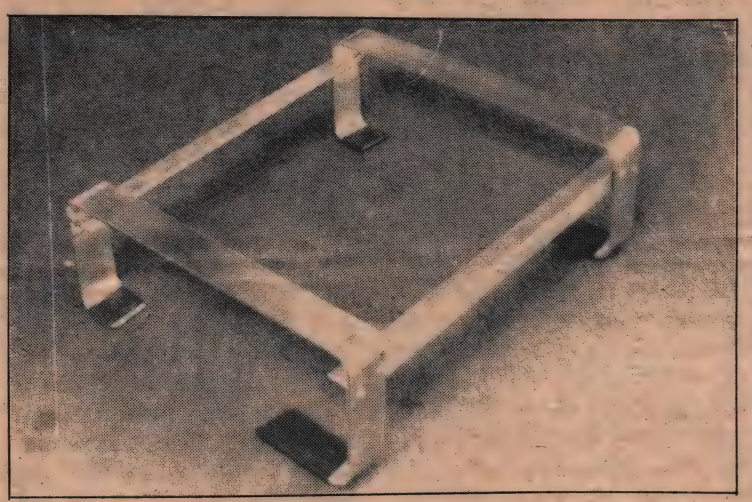
If the feet of the assembled stand are not perfectly square and level, they can be corrected by careful bending. The rubber ends on the feet of this stand were made from lengths of bicycle inner tube slipped over the ends of the pieces and glued in place. Regular adhesive-mount or screw-on rubber feet sold in Radio Shack or hardware stores will work fine, too.

The plain metal side rails on this particular model match perfectly with the rubber base of the DMP-110, and there have been no problems with the base "walking" due to vibration. With a heavier, "shakier" printer, you might want to glue a strip of felt, double-sided carpet tape, or foam weatherstripping on the top rails as a non-skid surface for the feet of the printer.

If you don't have a fancy bending brake or machinist's vise but still want to cold-bend the bar stock without bothering with a propane torch, a little improvising is necessary. You'll need two or three C-clamps, a sturdy tabletop with an edge for clamping, and some pieces of scrap lumber two or three feet long, such as pieces of 1"x3" furring or narrow hardwood flooring. If you don't have a vise, you'll probably have to leave a few extra inches of surplus bar stock on the ends of the pieces for leverage, and trim to exact length later. Clamp the stock to the table with one piece of wood, leaving the location of the desired bend just at the edge of the table. Clamp the portion of the stock extending past the bend with two more pieces of wood like a sandwich, and using them as a lever, bend the bar and then check with a square before unclamping, and setting up for the next bend. Continue as before in the hot-bending instructions, working continuously from one end, and comparing the measurements on the two pieces as you go.

What about using tubing instead of bar stock? Lots of scrap tubing is available from old lawn chairs, dead television antennas, beach umbrellas, etc. My personal prejudice is to make curved pieces only from flat bar stock, which is easier to bend, and to use tubing, pipe, conduit, etc. only for straight components. If you do want to do your own bending of tubing, keep a couple of suggestions in mind: 1) get a conduit bender, (called a "hickey" in the construction trade for reasons I won't even guess at) one that is designed for the diameter tubing you are going to use, and, 2) get plenty of practice with scrap stock, as tubing bends cause more "creep" than bends on bar stock, that is, they use up more of the length of the stock for each bend.

The basic design shown here can be modified to fit almost any printer. Even if the aluminum, rivets, and all are purchased new, the cost should not exceed ten to fifteen dollars, and with a little scrounging and improvisation that figure can probably be cut to less than half. Possible enhancements to the design might include a roll-paper support riveted to the rear cross brace, uneven front and rear legs to tilt the printer forwardrat an angle to make the copy easier to read, a second shelf for two kinds of fanfold paper or labels, and so on. A flat masonite or acrylic plastic plate could be mounted on the top of a similar frame to make a stand for stacking tools, books, floppy disk boxes, or a modem and phone handset, thus saving desk space. Use your imagination, and keep your propane torch warm and your rivet gun handy! ●



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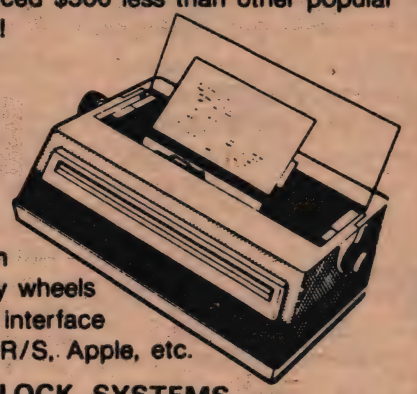

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Full Screen Editor For the Color Computer

by Tom Garcia

What is a "full screen editor" and why would you want one? I can't answer that question for every individual but I can offer this observation: Many color computer users would, if given a choice, select full screen editing over the somewhat complicated edit system supplied in ROM by Radio Shack with the popular CoCo. Maybe you are accustomed to this style of editing on the terminal at your school or place of work? Well, now you can also have it when you are writing or modifying basic programs on your color computer.

I used the CoCo's built-in edit statements for more than three years and didn't find them too objectionable. There are about a dozen things to remember, including several undocumented commands. With DSL's editor things are even better. There is hardly anything to remember as all you do is move the cursor around the screen with the arrow keys. When you get to where you want to be you type over the existing text (or blank space) for changes. You can even change the line numbers in a basic program by typing the new line number over the old line number. This is handy if you should (for instance) want to change *line 10* to *line 90*. No need to copy the line over, just change the number right there on the screen. The shift key can come into play during editing as it allows you to delete characters, insert spaces, and go "home," which is the top left corner of the screen. As you have no doubt deduced, full screen editing is very much akin to the methods employed by the popular word processing programs.

Still, if the editor only did what I have described above it would be questionable as to its value as a utility. You might want it and you might just as soon pass it up. The rest of my comments apply to the 64K version of the editor, (the 16K program is somewhat similar) and I hope that you will see how the "bells and whistles" that go beyond plain Jane editing make this a truly valuable program that you may want to buy.

Feature number one is an audible warning and a screen blink that the editor produces when you get near the limits of a program line, actually—at the end of the seventh line. A higher pitched warning occurs at the end of the eighth line, meaning that you have exceeded the computer's capabilities. If you are in the habit of writing long lines with lots of commands (or text) then you would be interested in this. Next, the keys on your keyboard are all "auto repeat" when the editor is on-line. You don't get a choice here, probably because the program has to make all keys repeat in order to have the arrow keys work as repeaters, vital for fast editing.

CoCo keeps growing up in the types of software available for it. Here, Tom Garcia reports on, Wonder-of-Wonders, a full screen Editor for CoCo. It comes with many of the bells and whistles found on big editors.

Some additional features are toggled on and off by the commands :L, :D and :S which do handy things. Each command is preceeded by a colon (:). The L is an additional version of LIST and I say additional because the standard LIST still works in the normal way should you want to use it. The new LIST allows you to control the speed of the LISTing with just one key. No more two finger dancing on the keyboard! And, you can now LIST in both directions, forward and backward. A nice touch.

The D command is an improved DIRectory command and it can be run in several ways such as listing to the screen only certain programs, as you instruct, by adding a suffix to the D input. The S command is a global search command that can be used to find any word or number in a program. You can just find it, find it and automatically replace it, or find it and be prompted with a (Y/N) to indicate your desire for a replacement or not. The S function is so powerful that I can't do it justice here. You have to see it to believe it. For example, you could automatically change every A$ in a program to ZZ$. Or, change all text entries of "1982" to 1984." An A command turns on automatic line numbering. In this mode a new line number comes up on the screen every time you hit ENTER.

There is a command designated X that doesn't seem to work and the documentation isn't quite clear as to why. The answer is that X is only needed for the 16K version of the program.

Speaking of documentation—you get three pages of written guidance plus a program called HELP/BAS which is an on screen tutorial. While there are some inconsistencies between the two sets of instructional materials and it's obvious that the writer was not an English major, the documentation is quite adequate.

A new cursor, a solid black block, replaces the old colored block. The idea here is to give you a reminder when you are in the full screen edit mode.

The editor is written in machine language and is loaded into the lower area of memory taking up the first two graphics pages. It then relocates to the upper 32K bank and all of your lower memory (less CoCo's usual overhead) becomes available for BASIC.

Another nifty thing that happens is that DISK BASIC is moved from ROM to the upper 32K of RAM. That is really interesting because you can modify DISK BASIC when it's in RAM. I have taken advantage of this to get DSKINI, DSKI$, and DSKO$ to work with more than 35 tracks on my disks. Many disk drives will work in a 40-track mode if you can modify Radio Shack's DOS to new specifications. Now, you can.

The only thing that I had any trouble with while the editor was installed was running BASIC programs that use the high speed POKE (65495.0). High speed doesn't work any more. I got around this by modifying those programs so that they check for the editor and if they find it they jump over the line with the high speed POKE command.

The Full Screen Editor is available from DSL Computer Products, Box 1176, Dearborn, MI 48121. The price of the program, on disk with both the 16K and the 64K versions, is $19.95 plus $2.00 shipping. ●

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TEXAS INSTRUMENTS

Randy's Ravings

by Randy Holcomb

This month's column will be sort of a catch-all of events that have happened the past few months that didn't make it in a previous column due to oversight or lack of substantial evidence to warrant printing. Our hardware series on upgrading the 99/4A hasn't been forgotten; several design issues have cropped up which we will expose later on.

First: For those of you who have sent me letters with SASEs: I haven't forgotten about you and will try to turn them around as fast as I can. Those letters asking specific questions may appear in our TI Questions And Answers section, so be sure and watch future issues; your letter might be answered right here!

Second: Many of you who are members of the TI Forum on CompuServe have asked questions about uploading and downloading to the system using the TE II cartridge and wondering why the UPL and DOW commands in Access and in SIG/Access don't work with your TE II cartridge. Well, it's quite simple: CIS does not "officially" support the TE II file transfer protocol in the Access software; HOWEVER, you CAN use a special program called TE2TRN, to upload and download files from CIS to your /4A and back. The directions are relatively easy to understand and follow once you've done it a few times. This will also help those of you contemplating signing up with CompuServe since these instructions will get you over the initial learning problems of performing uploads and downloads, so here we go.

The first step is to find out what is available in the system for you to download. To do this, first sign on to CompuServe (naturally) and go to the Public File Access System (GO PCS46). There you will be presented with a menu of available options to perform. The menu system, although helpful, adds some time to your bill and also can cause confusion, so the first thing to do at the Access prompt is to type the command:

SET NO MENU

This will just give you a lone prompt that simply says "Access:". Now, to find all the files that relate to the 99/4A, type in the command:

BRO /KEY:99

What will now happen is that Access will find all the entries in the database that have a "99" keyword and display them with the user ID of the submitter on the first line, the name of the file (normally 6 characters long followed by an optional 3 character prefix), the date the file was uploaded and the size of the file in bytes on the second line, followed by the number of accesses and the date the file was last accessed. After this info is shown, the keywords of the file and a description (up to 500 characters long) are displayed. After all of this is displayed Access will print out a prompt asking if you want to read the file, download the file or go to the top (back to command mode). If you want to continue looking for more /4A files, just hit ENTER; the next file will be displayed. If you want to narrow the search down to only files that start with a certain letter, just type in

BRO A????? /KEY:99

which will search and display the names and descriptions of files beginning with the letter A and with 99 in their keyword entry. If you just want listing of the filenames without any descriptions, just substitute CAT for BRO in the above commands presented. Using CAT will cut down on the output sent, allowing you to just examine the filename; that way if a filename has caught your eye, you can BRO the individual file for the full description.

Once you have determined what items that you wish to download, you will now issue the COPY command. Just type:

COPY <filename.ext>

where <filename.ext> is the name of the file as stored in Access. This will copy the file from Access into your own user disk area which is where TE2TRN will read the file from, for the file transfer process. Your user disk area on CompuServe can hold up to 128 Kbytes of information. See your User's Guide for more details about the disk area.

Now that you have the files, it's time to do the download. First, get out of Access by typing **EXI** (for Exit). This will return you to a menu prompt if you are using DISPLA or to the OK prompt if you are in command mode. If you are in command mode, you can skip this part and proceed to the paragraph titled TE2TRN. Otherwise, type PRO at the menu prompt. This command takes you directly to command mode. Once in command mode, you will receive the OK prompt. Now comes the downloading.

TE2TRN. To invoke the CIS/TI file transfer utility, type:

R USR:TE2TRN

at the OK prompt. You will see the following menu:

TI 99/4A Terminal Emulator II File Transfer Utility Program
(U)pload to CompuServe or (D)ownload to TI 99/4A?

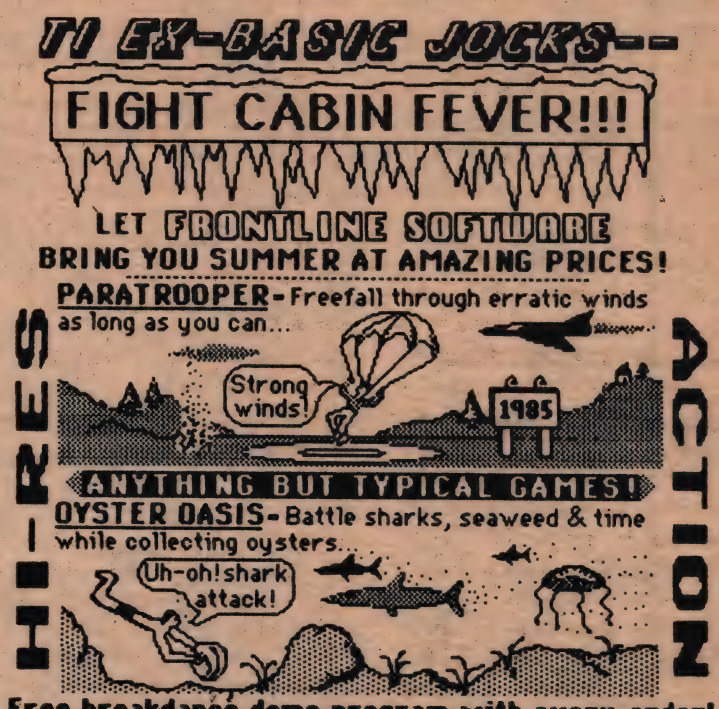
Type in D. TE2TRN will then respond with the line:

Enter the CompuServe File name:

Key in the name of the file in your CompuServe disk area that you wish to download. TE2TRN will then return with a message indicating that the downloading is started. TE II will then go into its HOST HAS STARTED FILE TRANSFER screen and prompts you for the disk name and the filename (see your TE II manual for information on the prompts and displays during this mode). During the transfer process you will see block and record numbers increment as the transfer proceeds. Upon a successful transfer you will get a SUCCESSFUL FILE TRANSFER message from TE II as well as one from TE2TRN. And that's all that there really is to downloading from CIS to your /4A!

Uploading to CIS from your /4A is just a little bit different but just as easy. First, determine what files you wish to

Continued on page 136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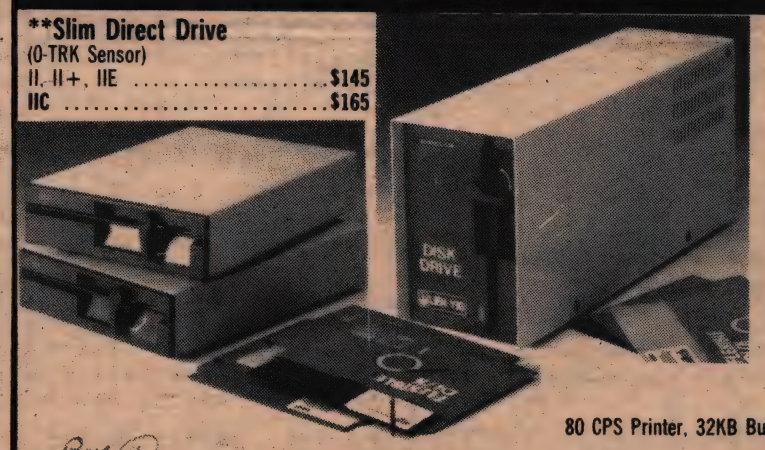

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Randy's Ravings
Continued from page 133

upload to CIS. Log on to CIS, go into command mode and run TE2TRN as you would an upload. When TE2TRN asks you for uploading or downloading, type U for upload. TE2TRN will ask for the CompuServe filename. Type in a valid CIS filename; this is the name of the file TE2TRN will create in your disk area on CIS where the uploaded file will be placed. TE2TRN will then respond:

Uploading <filename.ext>
Initiate Remote For Transfer
Hit Control/4 (TRANS)

When you hit CTRL 4 you will bring up the file screen for TE II. Key in the disk drive and the name of the file that you are uploading. After the filename is keyed in, the transfer begins—this time from your /4A to CompuServe. When completed, you will get the same successful file transfer message from TE II and TE2TRN.

Making your file available. Once you have uploaded your file to CompuServe you will want to place the file in the Public Access system for other 99/4A members to download to their systems. As with uploading, you go to the Public Access system (G PCS46) and you use the **SUBMIT <filename.ext>** to place the file into Access. Access will ask you for keywords and descriptions. For keywords it is strongly recommended that you use TI 99/4A and TE2TRN as part of your keyword entry. You will have a 500 character description after the keywords to describe the program you uploaded. After all the information has been provided, Access will redisplay the data you have entered and ask you if it is correct. You can change it if it isn't. Once you've OKed the file, Access copies the file from your disk area into a special area which is used by Access for all new submissions. Once SUBmitted, it can take between 24 to 48 hours for the file to appear in the Access system. The reason for this is that the network isn't one big computer, but a number of big computers, so updating each computer with the new files takes some time. Of course, once you have SUBmitted a file, you should go into the TI Forum and leave a message to the membership explaining what you have uploaded. If you forget the procedure for uploading and downloading, the files TE2TRN.HLP in DL2 and TINEWS.501 in DL1 on the TI Forum explains the process.

TE2TRN Caveats. Only files uploaded with TE2TRN can be downloaded by TE2TRN. This is because of the strong file-typing required by the TI disk management software, so any attempt to download a non-TE2TRN file with TE2TRN file will prove fruitless (not to mention receiving a nasty error message from TE2TRN, if attempted). As always, if you have any problems with TE2TRN, leave me a message on the TI Forum (ID # is 74065,1266) and we will help you over the rough spots.

Third: Our hardware project series on **Upgrading The TI 99/4A:** Due to timing problems, the next installment of this series will be in the April issue. By that time we will have a better idea on where we stand with our 99/4A upgrade AND our modem board. The modem board, which will not require a peripheral box, is awaiting a final rewrite of the software and testing before we release it. We're setting a target price of $75 for the kit. We will have more info on these projects as the series progresses.

Fourth: **More Disk Controller Woes.** A month after I wrote my somewhat enthusiastic review of the CorComp disk controller card (January 1985) the controller card "died." It

Continued on page 138

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Randy's Ravings
Continued from page 136

would not format double-density correctly. A mild form of panic set in as I recounted in last month's column that Cor-Comp is in Chapter 11. So, chancing it, I sent the card back for repair. What normally takes 2 weeks took over a month to have the card repaired, with the card arriving back after the start of the new year. Inspecting the card revealed a completely new PC board—no cuts, no jumpers, and **STILL** not working right. So back it went to Anaheim with a request for schematics and service information. During this time I also learned through the TI Forum of a number of outstanding orders for cards and many controller cards failing. Now I know that there are a number of people who DO have the cards and they have worked flawlessly—but it seems that I'm hearing more problems with this card than with any other 3rd party card. As for the Myarc DSDD Controller card, the demo card I had for a week fared far worse—it wouldn't even FORMAT a disk in EITHER mode! It's wait-and-see time again.

Fifth: **99/8 Alive?** Rumors are that Myarc is gearing for production of their 99/8 "clone" and will be ready by the end of the first quarter/early second quarter of this year. Its specs are close to the TI 99/8 as mentioned in last month's column. If (and it's a VERY BIG IF) they can successfully deliver this unit, we have some breathing room in hopes of keeping the /4A family growing; but until this beast hits your dealer's shelves we are still proceeding with our 99/4A upgrade board.

NEXT MONTH: The MBP Clock/ADC card, Part 2 of Upgrading the 99/4A, and more Info for and from the TI world. ●

RealType: A "Prequel" to Kaypro's "Type-It"?

Many microcomputer market-watchers know that Kaypro recently announced "Type-It," a typing program. It is not as widely known that the idea of a typing program was proposed to Kaypro's vice-president of marketing, David Kay, in a letter written last April by Michael Dortch. Dortch, a former Kaypro marketing consultant, is a co-founder of Real-Life Systems, which has begun shipments of its own typewriter program, RealType.

RealType offers character-by-character "electric" typing, line-by-line "electronic" typing with editing, and on-screen help and instructions. The product retails for $14.95, and is available immediately for almost any computer/printer combination supporting almost any version of the CP/M operating system, including CP/M-86 and CP/M 3.0. An MS-DOS version of RealType is also being prepared.

"Since David Kay never acknowledged my letter, Type-It was a big surprise to me—and couldn't have happened at a better time for RealType," said Dortch. "Type-It is basically a bundled product, for new Kaypro buyers. RealType is an independent product for everyone—including Kaypro users," Dortch added.

RealType was developed as a supplement and alternative to "full-blown" word processing programs. For brief notes, index cards, diskette labels and similar needs, Real-Life Systems found that word processing software is often too complex for novices, too cumbersome for simple tasks, and too expensive for potential computer buyers. "RealType lets any typist sit down at a computer and start typing, for a truly affordable price," said Dortch of Real-Life. "Offices with computers shouldn't also need typewriters, except as backups," according to Dortch.

Dortch and Real-Life co-founder Ken McCreery of Berkeley met while students at MIT. McCreery, who wrote the actual code for RealType, is also a contributor to books on microcomputing. Berkeley-based Real-Life Systems was founded in 1981 to develop software solutions for individual clients and specific markets.

RealType may be ordered directly from Real-Life Systems, which can be reached at 415/849-0798, or via MCI Mail at user ID "REALLIFE." Real-Life Systems' mailing address is 1518 Berkeley Way, Berkeley, CA 94703.

Mention that you read it in Computer Shopper. ●

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CP/M

New Releases Into Public Domain

by Bill Chin

There have been more releases recently into the IBM-PC compatible libraries of late

The current state of the libraries are as follows:

type	Users Group	Volume(s)
CP/M	Sig/M	000 to 209
PC-Blue	PC-Blue	000 to 086

The new releases from the PC-BLUE group are volumes 077 thru 086.

Volumes 077 and 078 are releases of the FIDO-Net BBS software version level 9. Its another bulletin board and file interchange collection of programs, this version is for the IBM-PC. Others are available for differing machine configurations as DEC Rainbow series etc. Contact Tom Jennings on Fido #1 or Fidonet #1. This is an attempt to network FIDO's in prime 'communication'cost time charges for fellow modem'rs. READ FEVER.DOC by Steve King...It hits you... in the hard and soft of having a MODEM.

PC-Blue Volume 077
FIDO-Net Bulletin BHARD System v9
(volume 1 of 2)

-CATALOG.077 contents of PC-Blue Volume 077
CRCK4 .COM checksum program
LAR .EXE extraction program
NUSQ .EXE unsqueeze program

index	name	size	crc
077.01	FIDOBBS .LBR	12K	E3 07
077.02	FIDOTXT .LBR	36K	52 D8
077.03	FIDOEXE .LBR	124K	BD 62
077.04	FIDOSYS .LBR	7K	65 D6
077.05	FIDOMISC.LBR	41K	24 4D
077.06	READFIDO.ME	2K	94 0C

PC-Blue Volume 078
FIDO-Net Bulletin BHARD System v9
(volume 2 of 2)

-CATALOG.078 contents of PC-Blue Volume 078
CRCK4 .COM checksum program
LAR .EXE extraction program
NUSQ .EXE unsqueeze program

index	name	size	crc
078.01	FIDODOC .LBR	121K	A4 BC
078.02	FIDO .LBR	75K	97 DB

Volume 079 is another revision of the popular RBBS-PC software which is maintained by the CPCUG in the Washington DC area.

Please Note the documentation is in a SQueezed stored format and WILL require expansion to a full diskette.

PC-Blue Volume 079
Remote Bulletin Board System
RBBS-PC v12.2c
from Capitol-PC Users Group

-CATALOG.079 contents of PC-Blue Volume 079
CRCK4 .COM checkup program

index	name	size	crc
079.01	HELP01 .	1K	61 10
079.02	HELP02 .	1K	9A 55
079.03	HELP03 .	1K	A6 B9
079.04	HELP04 .	1K	56 63
079.05	HELP05 .	1K	5B D3
079.06	HELP06 .QQQ	6K	F1 06
079.07	HELP07 .	2K	7C 70
079.08	HELP08 .	1K	A0 7B
079.09	DIR .	1K	62 ED
079.10	DIR99 .	1K	DC D6
079.11	MENU1 .	1K	F7 7B
079.12	MENU2 .	1K	D5 AA
079.13	MENU3 .	1K	99 6A
079.14	MENU4 .	1K	1D DA
079.15	MENU5 .	1K	C4 2D
079.16	MENU1G .	1K	24 8E
079.17	MENU2G .	1K	B4 D9
079.18	MENU3G .	1K	92 BC
079.19	MENU4G .	1K	CE 32
079.20	MENU5G .	2K	0A A2
079.21	BULLETIN.	1K	B8 89
079.22	BULLET1 .QQQ	2K	EF BF
079.23	RBBS-PC .BAS	48K	80 31
079.24	RBBS-PC .EXE	104K	61 B5
079.25	RBBS-PC .DOC	66K	BA 29
079.26	WELCOME .	1K	91 FF
079.27	NEWUSER .	1K	FE 87
079.28	CONFIG .BQS	38K	9C 0F
079.29	DOC .BAT	1K	0D BE
079.30	STARTUP .BAT	3K	35 E7
079.31	UTSPACE .OBJ	1K	CF 87
079.32	README .	2K	A2 EE
079.33	FUSR122B.BAS	2K	32 B1
079.34	UNSQ .COM	12K	72 20

Ever want to move data around your computer but not know how to because IBM never supplied the facility to do it? .. here's another utility for stirring up your data and sorting.. etc ... or how's about all the BS which is usually inserted into documents try FOG-Index... It cuts through the BS in however you decide... No Its not a spellchecker nor a Theasurus..whatever cognates and clauses... oh well. Its interesting to say the least.

PC-Blue Volume 080
Multi-Function Utility v2.0
Experimental LISP - XLISP
Fog Finder v1.0
Load/Execute from .LBR v1.2

-CATALOG.080 contents of PC-Blue Volume 080

index	name	size	crc
Multi-Function Utility v2.0			
080.01	UTIL .DOC	109K	80 68
080.02	UTIL .EXE	53K	1B FD
080.03	DATABASE.	1K	7D A4
080.04	READ .ME	16K	60 93
Experimental LISP			
080.05	XLISP .EXE	41K	7B 37
080.06	XLISP .DOC	29K	DB 6E
080.07	DEFUN .LSP	1K	D5 E6
Fog Finder v1.0			
080.08	FOGFIND .EXE	15K	89 5F
080.09	FOGFIND .DOC	12K	42 4F

Load and Execute a program from a extracting it from the library.

080.10	LRUN .EXE	11K	4F B2	
080.11	LRUN .DOC	11K	F5 0B	

PC-Blue Volume 081
Miscellaneous Utilities
revisions of some commonly used utilities.

-CATALOG.081 contents of PC-Blue Volume 081
CRCK4 .COM checksum program

index	name	size	crc
updated Library Utility v4.02 for packing and unpacking filegroups.			
081.01	LU .EXE	24K	98 38
081.02	LU .DOC	13K	7A A4
081.03	LUDEF5 .DOC	17K	8D C0
updated NUnsqueeze v1.04D a much improved unsqeeze utility.			
081.04	NUSQ .COM	3K	FB 00
updated Squeeze v1.7			
081.05	SQ .EXE	20K	7A 7A
Poor Man's Mouse			
081.06	PMM .EXE	21K	84 3F
081.07	PMM .DOC	3K	1B 15
"Talking" IBM PC			
081.08	TALKER .BAS	11K	AF 41
081.09	TALKFUN .BAS	11K	25 E2
PC-DOS HELP subsystem			
081.10	HELP .COM	13K	44 0E
081.11	HELP .DAT	17K	E1 6D
Bi-Directional Scroll v6.4			
081.12	BACKSCRL.DOC	12K	F0 AA
081.13	BACKSCRL.COM	7K	03 96
File Utility v1.30			
081.14	CWEEP .EXE	26K	63 67
BASIC Cross Reference			
081.15	XREF .EXE	26K	68 CE
Abstract Design Display			
081.16	DESIGN .BAS	14K	90 13
Testdata Generator			
081.17	GENERATE.ASC	14K	87 E5
Prints Neat Listing of "C" Program			
081.18	CPRINT .C	7K	83 B2
081.19	CPRINT .EXE	13K	95 53
081.20	CPRINT .OBJ	4K	DB 7B
Disk Directory Utility			
081.21	DDIR .COM	19K	0A 3E
ASCII File Listing Program			
081.22	L4 .DOC	3K	CC 5B
081.23	L4 .COM	3K	91 FB
Equipment Status			
081.24	EQUIP .COM	2K	76 30
081.25	EQUIP .DOC	3K	0B D6

The FORTH language revolution now comes into the 16 bit arena. Here's one for the IBM-PC users.

Do note that the files are in sQueezed format and thus may require for available disk space.
PC-Blue Volume 082

B086 FORTH v2.1.0

-CATALOG.082 contents of PC-Blue Volume 082
CRCK4 .COM checksum program
NUSQ .COM unsqueeze program

index	name	size	crc
082.01	BASIC .BQK	5K	D0 09
082.02	CLOCK .BQK	3K	EE 3A
082.03	CPU8086 .BQK	15K	65 E9
082.04	EXPAND86.BQK	3K	21 8E
082.05	EXTEND86.BQK	9K	00 0B
082.06	F83-FIXS.TQT	4K	14 22
082.07	HUFFMAN .BQK	13K	AA 2C
082.08	KERNEL86.BQK	62K	D3 BB
082.09	META86 .BQK	14K	C7 BC
082.10	README .1ST	3K	26 C1
082.11	README .PQ	12K	3D 1A
082.12	UTILITY .BQK	36K	C0 90
082.13	F83 .COM	26K	D3 3E

For those wanting to either to GET their Finances IN ORDER or to setup a business finance area here's an evaluation copy submitted as a sample to try.. OR How about an appointment calendar similar to FRIDAY for your personal use...
PC-Blue Volume 083
Finance Manager v3.0
Personal Datebook

-CATALOG.083 contents of PC-Blue Volume 083
CRCK4 .COM checksum program

index	name	size	crc
Finance Manager v3.0			
083.01	README .	2K	F9 24
083.02	PRINT_ME.DOC	55K	87 8B
083.03	AUTOEXEC.BAT	1K	FA B1
083.04	FM .EXE	113K	B1 AD
083.05	FM .CNF	1K	15 7A
083.06	WORK .CRT	3K	DA 3F
083.07	WORK .NAM	1K	D7 32
083.08	WORK .TRN	4K	64 DB
083.09	HOME .CRT	3K	E8 3F
083.10	HOME .NAM	1K	69 61
083.11	HOME .TRN	6K	E0 D1
083.12	JUKI .CNF	1K	7F F1
Personal Datebook			
083.13	MEMO .BAT	1K	00 00
083.14	MEMO .BAS	27K	CA 9E
083.15	MANUAL .TXT	36K	C9 FD
083.16	MANUAL .EXE	23K	44 31
083.17	CONVERT .BAS	6K	39 0B
083.18	CONVERT .BAT	1K	00 00

Some revised as well as new worksheets for those 1-2-3 users. Financial as well as survey stuff.
PC-Blue Volume 084
LOTUS Power Worksheets

-CATALOG.084 contents of PC-Blue Volume 084
CRCK4 .COM checksum program

index	name	size	crc
LOTUS Power Worksheets			
084.01	README .1ST	15K	1B EF
084.02	PRINTDOC.BAT	1K	EB E3
084.03	AUTO123 .WKS	7K	05 B9
084.04	AGENDA .WKS	3K	15 E1
084.05	BSTAT .WKS	18K	E1 04
084.06	DEPREC .WKS	25K	F2 F4
084.07	NPV .WKS	12K	0B 6F
084.08	PROFIT .WKS	19K	9C DD
084.09	ROR .WKS	15K	14 7C
084.10	SREGR .WKS	12K	15 ED
084.11	TEST .WKS	10K	EF A3
084.12	TV .WKS	3K	55 5C
These are squeezed document files requiring NUSQ.COM for expansion			
084.13	INTRO .DOC	4K	60 A7
084.14	BSTAT .DOC	10K	0B B0
084.15	DEPREC .DOC	13K	E1 48
084.16	NPV .DOC	11K	BA 26
084.17	PROFIT .DOC	21K	67 0D
084.18	ROR .DOC	14K	B0 6D
084.19	SREGR .DOC	17K	33 4B
084.20	NSQ .EXE	21K	23 CA
084.21	NUSQ .COM	3K	DD 00

GLUDRAW is a self menu driven installable graphics system for those liking CADCAM design .

PC-Blue Volume 085
GLUDRAW - Line Graphics System

-CATALOG.085 contents of PC-Blue Volume 085
CRCK4 .COM checksum program

index	name	size	crc
G L U D R A W - Line Graphics			
085.01	DRAW3 .EXE	32K	4B 2F
085.02	DRAW2 .EXE	27K	4F 32
085.03	GLUDRAW .EXE	21K	31 76
085.04	BASRUN .EXE	31K	AB B7
085.05	DRAW4 .EXE	17K	90 CA
085.06	DRAW5 .EXE	25K	50 49
085.07	DRAWEXIT.HLP	2K	2C 03
085.08	DRAWALTX.HLP	1K	FB 68
085.09	DRAWTEXT.HLP	2K	E7 B1
085.10	DRAWGENR.HLP	3K	F0 C6
085.11	DRAWCKEY.HLP	3K	E7 4C
085.12	DRAWASPE.HLP	2K	FD FA
085.13	DRAWGRID.HLP	1K	A2 62
085.14	DRAWFFIB.HLP	3K	67 F7
085.15	DRAWCSPE.HLP	1K	BD B4
085.16	DRAWCOLR.HLP	1K	8D E5
085.17	DRAWFIND.HLP	1K	B6 13
085.18	DRAWMOVE.HLP	1K	EA FE
085.19	DRAWNEWP.HLP	1K	BF F8
085.20	DRAWDELL.HLP	1K	E9 DD
085.21	DRAWLINE.HLP	1K	5C 2C
085.22	DRAWCURV.HLP	2K	79 C6
085.23	DRAWEXPE.HLP	2K	F6 CE
085.24	DRAWMVBX.HLP	4K	50 D6
085.25	DRAWCPIC.HLP	4K	BE C4
085.26	DRAWCIRC.HLP	1K	EC B3
085.27	DRAWPAIN.HLP	2K	07 D6
085.28	DRAWDRCO.HLP	2K	7A 65
085.29	DRAWDOTX.HLP	1K	35 A0
085.30	DRAWCONV.HLP	2K	6A E1
085.31	DRAWFLIP.HLP	1K	B9 36
085.32	DRAWBRBX.HLP	2K	FE CF
085.33	DRAWCOPY.HLP	1K	42 81
085.34	DRAWDL10.HLP	1K	36 3F
085.35	DRAWDLBX.HLP	2K	FA 53
085.36	DRAWDRBX.HLP	2K	69 FF
085.37	DRAWROTA.HLP	2K	52 9A
Sample Drawings...			
085.38	DINOSAUR.PIC	5K	1C 63
085.39	DFTLO1 .PIC	1K	C9 C4
085.40	LION .PIC	3K	41 B9
085.41	DFTUP1 .PIC	1K	1B D8
085.42	TWAIN .PIC	3K	D9 66
085.43	HOUSE .PIC	2K	95 F8
085.44	ENGUP1 .PIC	4K	F4 25
085.45	DFTUP2 .PIC	1K	2D BF
085.46	ROMNUM .PIC	2K	EB BB
085.47	SNOFLAKE.PIC	3K	50 E1
085.48	EYE .PIC	3K	67 8B
085.49	ROMUP1 .PIC	2K	FB D6
085.50	CAR .PIC	1K	CF 13
085.51	HORSE .PIC	2K	FE A9
085.52	ZEPHYR .PIC	2K	E1 CA
085.53	ELEPHANT.PIC	2K	EF EE
085.54	NOSES .PIC	3K	8C 04
085.55	GOLF .PIC	1K	5D C9
085.56	ENGUP2 .PIC	4K	EB 87
085.57	SHADING .PIC	1K	5E D4
085.58	ROMUP2 .PIC	2K	F6 17
085.59	SHAPES .PIC	1K	21 0E
085.60	DFTLO2 .PIC	1K	1B 40
085.61	ENGNUM .PIC	2K	AA 4E
085.62	DFTNUM .PIC	1K	1A EE
085.63	ROMLO1 .PIC	2K	CB 76
085.64	TRUCK .PIC	1K	14 B9
085.65	ROMLO2 .PIC	2K	FB 31
085.66	ENGLO1 .PIC	2K	8C FD
085.67	ENGLO2 .PIC	2K	40 35
085.68	DRAWHELP.DIR	2K	23 2B

Another CP/M text processor system as ROFF becomes an IBM-PC supportable system by (Ernest Bergmann). The Extended batch language system is (from F. Canova) a self menu driven sub system for controlling your program execution FLOW within your IBM-PC.

PC-Blue Volume 086
MS-DOS version of
ROFF Text Editor v1.60
Extended Batch Language v2.0

-CATALOG.086 contents of PC-Blue volume 086
CRCK4 .COM checksum program

index	name	size	crc
086.01	ROFF4 .O	10K	B1 1C
086.02	ROFF4 .C	14K	F0 65
086.03	ROFF4 .H	9K	82 32
086.04	ROFF41 .C	6K	B8 E8
086.05	ROFF42 .C	5K	A2 E3
086.06	ROFF43 .C	5K	BE BF
086.07	ROFF44 .C	6K	4A 1D
086.08	ROFF45 .C	8K	45 1B
086.09	ROFF46 .C	8K	56 31
086.10	ROFF47 .C	9K	4E BE
086.11	ROFF4 .DOC	35K	E3 E9
086.12	BROF .BAT	1K	00 00
086.13	ROFF4 .EXE	30K	3B 02
086.14	CROF .BAT	1K	00 00
086.15	PROWRITE.	4K	A3 0E
086.16	EQN .	1K	99 98
086.17	ONE .	1K	49 EE
086.18	TWO .	1K	2D 66
086.19	THREE .	1K	A7 6A
086.20	SOTEST .	1K	3E E0
086.21	NETEST .	1K	AE 1C
086.22	PAGES .	2K	9B 83
086.23	NEC3525 .	3K	E2 16
086.24	MX80 .	6K	AC F6
086.25	ML92 .	8K	0C D0
086.26	READ .ME	4K	21 9B
086.27	COPY .RIT	1K	16 95
086.28	NEST .	1K	89 C4
086.29	LIST .	1K	8E 32
086.30	FORM .	1K	16 3F
086.31	MARGINS .	2K	0B BE
086.32	MATRIX .	1K	B7 FC
086.33	UPGRADES.LST	4K	78 E3
086.34	FOOT .	1K	55 A9
086.35	CHANGES .	1K	22 58
086.36	ROFF4MSD.	2K	00 55
Extended Batch Language version 2.0			
086.37	BAT .COM	10K	76 C7
086.38	ERRATA .	8K	8B A7
086.39	BATDOC .BAT	38K	29 E4
086.40	BATDEMO .BAT	10K	19 E5
086.41	BACKUP .BAT	2K	B3 0E
086.42	VCOPY .BAT	3K	50 BB
086.43	EDIT .BAT	1K	D5 C5
086.44	TELE .BAT	1K	4C 56
086.45	DIAL .BAT	3K	BE F3

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FRONT RANGE BBS (TRS-80) Denver. CO 303-772-7229 *24
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GOLD STRIKE BOARD Denver. CO 303-278-1487 *24
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PINECLIFF RMPM Pine Cliff. CO 303-642-3034
RCP/M CUG-NOTE Denver. CO 303-781-4937 *24
RCP/M RBBS Arvada Elec. Colorado Springs. CO 303-634-1158 *24
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REMOTE NORTHSTAR Denver. CO 303-444-7231
NETWORKS ABBS Info International NW. Reedy. WV 304-927-1773
NET-WORKS Charleston. WV 304-345-8280
TRI-STATE AREA BBS Huntington. WV 304-429-3918
AUTOBOARD -1 -COMMODORE- Stuart Users' BBS (STUBBS) Stuart. FL 305-286-2509 *24
BBS Homestead. FL 305-246-1111
BBS The Notebook West Palm Bch.. FL 305-686-4862
C-64 BBS1 305-238-2271. This is a Punter BBS
CECIL'S NITE OWL Palm Bch.. FL 305-588-0487 *24
CHALKBOARD Hollywood. FL 305-962-6052 *24
COLOR BURST Ft. Lauderdale 305-525-1192 *24
CRYSTAL PALACE (ATARI) 305-722-1697 *24
DIAL-YOUR-MATCH Sunrise. FL 305-741-2308
EL-SHIFT-OH Cocoa. FL 305-783-8905 *24
EMERALD CAVERN Hollywood. FL 305-981-4252
FORUM-80 Ft. Lauderdale. FL 305-772-4444 *24
GREENE MACHINE SPACECOAST 305-268-8356 *24
GREEN MACHINE SPACECOAST 2 305-453-6561 *24
CABLE BOX Pembroke Pines 305-432-5969 *24
MAGIC CITY MICRO (MCM) Magic City. FL 305-271-6644 *24
MAGIC CITY MICRO (MCM) SOFTWARE FORUM Coral Gables. FL 305-441-2150 (6pm-9am)
MAGIC CITY WORLD OF TRON Miami. FL 305-264-9964 *24
ONE STEP BEYOND Longwood. FL 305-831-0032
NET-WORKS Big APPLE Miami. FL 305-948-8000
PIRATE-80 305-255-8059 *24
QUILL, AMIS BBS Palm Bay. FL 305-724-2303
RAMIK ONE BBS Lake Worth. FL 305-439-8710
RBBS HEATH KIT 305-823-2281 6pm-8am
RBBS SOUTHERN MICRO 305-625-3181 *24
SCAUG BBS Merritt Island. FL 305-453-6998
SPACE SHUTTLE BBS (SSBBS) Satellite Beach. FL 305-777-4714 *24
TBBS Orlando. FL 305-644-8327 *24
TECH-80 305-266-1032 *24
THE BYTE SHOP 305-261-3639. Networks Not BBS
TIBBS West Palm. FL 305-793-8050
TRADE 80 Ft. Lauderdale. FL 305-525-1192
TRADE 80 of Miami 305-947-7930 *24
TRADE 80 Pompano Bch. 305-426-8080 *24
TREASURE QUEST Vero Beach. FL 305-562-1627 *24
UNICORN, AMIS BBS Palm Bay. FL 305-729-9575
YBBS The Heath Bar 305-940-8795 *24
PET BBSSe Wyoming PUG 307-637-6045 *24
ThE EXPRESS East Peoria. IL 309-699-6359 noon-11pm CST
NET-WORKS MAGIE Galesburg. IL 309-342-7178
ABBS Chicago. IL 312-743-3153
ABBS Gamemaster. Chicago. IL 312-475-4884 *24
ABBS Lincolnwood. IL 312-764-6502
ABBS Rogers Park. Chicago. IL 312-973-2227
AMIS Bellwood. IL 312-544-7228
AMIS Chicago. IL 312-789-3610 *24
AMIS Lombard. IL 312-620-6441
The BASIC BBS Aurora. IL 312-896-9628 3pm-11pm
CBBS Chicago. IL 312-545-8086 *24
CBBS Chicago. IL 312-876-0974
CBBS Dolton. IL 312-849-1132
CHICAGO GREEN MACHINE 312-622-4442
CO-OP BBS Arlington Heights. IL 312-228-1495
CP/M Chicago. IL 312-326-4392
CP/M Chicago. IL 312-338-8827
CP/M Chicago. IL 312-537-7888
CP/M Chicago. IL 312-861-1797
CP/M Downers Grove. IL 312-852-1305
CP/M Glen Ellyn 312-469-2597
DIAL-YOUR-MATCH -39 312-243-1046
HCOM Chicago. IL 312-267-2066
HP1 Palantine. IL 312-397-8308
MCMS C.A.M.S. Chicago. IL 312-927-1020 *24
MCMS Hanover Park. IL 312-289-7619
MCMS L.A.M.S. Round Lake. IL 312-740-9128
MCMS Waco Hotline. Schaumburg. IL 312-351-4374 *24
MCMS Wheaton. IL 312-462-7560
NESSY Chicago. IL 312-773-3308
NET Arlington Heights. IL 312-392-2403
NET ⁵ Arlington Heights. IL 312-398-0970
NET ⁵ Chicago. IL 312-545-5866
NET Chicago. IL 312-685-9573
NET Chicago. IL 312-278-7261
NET Lombard. IL 312-627-5138
NET Wheaton. IL 312-260-0748
NET Skokie. IL 312-674-9246
NET-WORKS Chipmunk. Hinsdale. IL 312-323-3741 *24
NET-WORKS North Parks. Chicago. IL 312-745-0924
OCCCS #2 Wheaton. IL 312-588-7917
OT Berwyn. IL 312-795-0871
PBBS Co-Operative Comp. Palatine. IL 312-359-9450 *24
PCM Midlothian. IL 312-396-1022
PET BBS COMMODORE Chicago. IL 312-397-0871 *24
PMS Chicago Public Library 312-235-3200
PMS Chicago. IL 312-373-8057 *24
PMS I.A.C. Lake Forest. IL 312-295-3926 *24
RIPCO 1200/300 BAUD. Chicago. IL 312-528-5020 *24
RCP/M AIMS Hinsdale. IL 312-789-0499 *24
RCP/M IBM PC Niles. IL 312-259-8086
RCP/M Logan Square. Chicago. IL 312-252-2136
RCP/M NEI. Chicago. IL 312-949-6189
TBBS Chicago. IL 312-445-4545
TIBB Oak Park. IL 312-848-3669
UNIVERSITY CONFERENCE INFORMATION NET Chicago. IL 312-942-0089
WAUKEGAN PUBLIC LIBRARY SYSTEM BBS Waukegan. IL 312-623-2226
ABBS Detroit. MI 313-477-4471
ABBS Michigan Apple-Fone Southfield. MI 313-357-1422
AMIS A.R.C.A.D.E. Sterling Hgts.. MI 313-978-8087 *24
AMIS M.A.C.E. Detroit. MI 313-368-2064 *24
AMIS MACE. Michigan 313-274-3940
AMIS Michigan 313-544-0885
APPLE-GRAM 313-292-0389
BBS Metro Detroit. MI 313-455-4277
BULLET-80 Waterford. MI 313-683-5076 *24
CBM-U Commodore Detroit. MI 313-273-9551 *24
CCCC BBS Canton. MI 313-981-5061
DAVY JONES LOCKER 313-764-1837
DIAL-YOUR-MATCH -37 313-736-1398
MC CBBS 313-243-4561 *24
RCP/M Detroit. MI 313-584-1044
RCP/M MCBBS Keith Peterson. Royal Oak. MI 313-759-6569
RCP/M MCBBS TCBBS Dearborn. MI 313-846-6127 *24
RCP/M RBBS Pontiac. MI 313-338-8505
RCP/M RBBS Southfield. MI 313-559-5326 *24
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TIBBS Detroit. MI 313-288-0530
TIBBS Oak Park. MI 313-544-7788
TIBBS Warren. MI 313-751-1119
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FORUM-80 Wichita. KS 316-682-2113 *24
TIBBS Wichita. KS 316-681-3167
COLOSSUS-TIBBS SYSTEM Wichita. KS 316-687-4307
FORUM-80 Wichita. KS 316-682-2113 *24
GREAT INLAND SEA BBS 316-685-1190 6pm-8am
INFOEX 80 316-722-9526
OMEGA BBS Wichita. KS 316-685-8202 SYSOP Donna Molony *24
TIBBS Wichita. KS 316-681-3167
The COCO BULLET Indianapolis. IN 317-291-7827 *24
PMS Indianapolis. IN 317-787-5486
PMS SOFTWARE EXCHANGE Indianapolis. IN 317-251-7796 8:30pm-10am
CBM-U COMMODORE Crowley. LA 318-783-2647 *24
DIAL-YOUR-MATCH -66 Layfayette. LA 318-233-7472
FORUM-80 Shreveport. LA 318-631-7107 *24
STAR (LINC) BBS Shreveport. LA 318-688-0522 *24
ABBS Apple-Med.. Iowa City. IA 319-353-6528
CompuCenter IOWA 319-338-2750 300/1200 Baud Upload/Download
IBM PC Cedar Rapids. IA 319-363-3314
AMIS Rhode Island 410-521-1998
NET-WORKS Computer City. Providence. RI 401-331-8450 *24
ABBS Omaha. NE 402-339-7809
DIAL-YOUR-MATCH -23 402-571-8942
TRADE-80 Omaha. NE 402-292-6184
LETHRIDGE CAMING SYSTEM Lethbridge. AB 403-320-6923
RCP/M RBBS Computron Edmonton. Alberta. Canada 403-482-6854
BBS IBM Hostcomm Atlanta. GA 404-252-4146
CBBS ATLANTA COMPUTER SOCIETY Atlanta. GA 404-636-6130
ITBBS Riverside. GA 404-471-8824
NOCHANGE Atlanta. GA 404-587-4198 *24
TERMINAL WANT ADS Atlanta. GA 404-292-7029 *24
TIBBS Atlanta. GA 404-928-4278 & 404-471-1283
TIBBS Ringgold. GA 404-935-4054
AMIS Oklahoma 405-681-6929
AMIS Oklahoma 405-685-2027
ARMU Oklahoma 405-722-5056
HBBS Oklahoma City 405-848-9329 *24
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BBS -5 San Jose. CA 408-984-7937
BULLET-80 San Jose. CA 408-241-0769
BYTE BANDITS OF AMERICA TRS-80'S COMPUTER CLUB San Jose. CA 408-374-3974 Free access *24
COMPUCAT Los Gatos. CA 408-353-1836
DIAL-YOUR-MATCH -56 408-736-7356
GENDERNET Sunnyvale. CA 408-734-8727 300/1200 Baud *24
INFORMATION EXCHANGE SYSTEM -1 Sunnyvale. CA 408-733-1364 8pm-11pm weekdays. 24 hrs weekends/holidays
NET-WORKS Computer Emporium. San Jose. CA 408-227-0227
PMS Cambell. CA 408-370-0873 *24
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RCP/M Collosal Oxgate. San Jose. CA 408-263-2588
RCP/M RBBS Data Tech 004 Sunnyvale. CA 408-732-4233
RCP/M RBBS San Jose Oxgate. San Jose. CA 408-287-5901 *24
RCP/M Silicon Valley. CA 408-246-5014 *24
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DBBS Derry. PA 412-694-5750
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PGH L5 Pittsburgh. PA 412-366-6099 *24
PITTSBURGH ATARI COMPUTER ENTHUSIASTS 412-963-1355 *24
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BBS SUE Milwaukee. WI 414-352-2772
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CBBS Maude Milwaukee. WI 414-241-8364 *24
EXEC-PC IBM PC Milwaukee. WI 414-964-5160 *24
PET BBS S.E.W.P.U.G. Racine. WI 414-554-9520 *24
RCP/M RBBS Mike's Milwaukee. WI 414-647-0903
S.C.S. ABBS Lt. Suamico. WI 414-434-3253 8pm-7am
TIBBS Appleton. WI 414-739-5380
TIBBS Freedom. WI 414-788-9730
TBBS Canopus. Milwaukee. WI 414-281-0545 *24
ABBS Computerland. Fremont. CA 415-794-9314
ABBS Hayward. CA 415-881-5662
ABBS PCNET. San Francisco. CA 415-863-4703
ABBS South of Market. San Francisco. CA 415-469-8111
ARMU Synapse CA 415-527-8276
BBS Living Videotext Menlo Park. CA 415-327-8876 *24
BLUE BOSS IBM PC Berkely. CA 415-845-9462 *24
CBBS Lamda. Berkeley. CA 415-658-2919
CBBS Proxima. Berkeley. CA 415-357-1130
CONFERENCE-TREE -3 Hayward. CA 415-538-3580
CONNECTION-80 Fremont. CA 415-651-4147 *24
DIAL-YOUR-MATCH -10 415-467-2588
DIAL-YOUR-MATCH -17 415-991-4911
DIAL-YOUR-MATCH -56A 415-964-3255
DRUMMER 415-552-7671
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KINKY KUMPUTER San Francisco. CA 415-552-8268
MRCBBS 415-968-6501
ON LINE DEPARTMENT 415 334-7555
P. BAY BBS San Francisco. CA 415-775-2384
PMS Pleasanton. CA 415-462-7419 *24
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RBBS DataTech 006. San Francisco. CA 415-563-4953
RCP/M BBBS Marin County. CA 415-383-0473 *24
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NET-WORKS SPARLIN' CITY Corpus Christi. TX 512-882-6569
SATUG BBS San Antonio. TX 512-494-0285
The CATHOUSE Cincinnati. OH 513-528-0707 *24
CBBS 513-825-4478 *24
CIN-SOFT 513-396-7467 *24
CIN-TUG (TRS-80) (TBBS) 513-474-2985 *24
COCONUT (TBBS) 513-984-8705 *24
COMM-DATA 513-271-4274 *24
CRAB 513-738-4813 *24
SOFTWARE PLUS 513-621-9273
CBM-U CONNECTION LaSalle. Quebec 514-365-9914 *24
CONNECTION-80 LAUAL BELE Laual. Quebec. Canada 514-622-1275 *24
DISTRA-SOFT Montreal. Quebec. Canada 514-327-5764 *24
ON-LINE COMUPTERLAND Montreal. Quebec. Canada 514-931-0458 *24
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TIBBS Knoxville. IA 515-842-2104
ABBS PIRATES COVE Long Island. NY 516-698-4008
ADVENTURE BBS 516-621-9296
CBBS LICA LIMBS Long Island. NY 516-561-6590 *24
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CONNECTION-80 Great Neck. NY 516-482-8491 *24
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LION Long Island Osborn Network 516-567-8267
LNW BBS 300/1200 Baud Long Island. NY 516-924-9229
N/C & JOB COST, IBM, VICTOR, TI, TRS80 III & IV, Port Washington. NY 516-944-7007
NET-WORKS PIRATE'S TREK 516-627-9048
STAR TREK III 516-569-0589 *24 run on ATARI 300/1200
TIES Wantagh. NY 516-781-1762 *24. 7 days
TI SOURCE Long Island. NY 516-475-6463
C.H.A.O.S. Lansing. MI 517 373-6788
C/NET! Saginaw. MI 517 793-7407
CONNECTION-80 Lansing. Mi 517 339-3367
CAPITOL CITY BBS Albany. NY 518-346-3596 *24
TIBBS Albany. NY 518-765-4993
APPLE-SPICE (NETWORKS II) Windsor. Ontario. Canada 519-945-3555 6pm-6am
CBM-U COMMODORE London Ontario 519-679-9101 *24
NORATECH ONLINE Windsor. Ontario. Canada 519-966-4334 *24
BULLET-80 Hattiesburg. MS 601-264-2361 *24
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REMOTE APPLE Jackson. MS 601-992-1918 *24
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A.C.C.E.S.S. Phoenix. AZ 602-996-9709 *24
A.C.C.E.S.S. Phoenix. AZ 602-957-4428 *24
A.C.C.E.S.S. Phoenix. AZ 602-274-5964
A.C.C.E.S.S. Scotsdale. AZ 602-998-9411 *24
APPLEWRITER Thatcher. AZ 602-428-4073
BBS APOLLO Phoenix. AZ 602-246-1432 *24
CBBS TSG Tucson. AZ 602-574-0327 *24
CBBS TSG Tucson. AZ 602-746-3956 *24
CONFERENCE TREE Clendale. AZ 602 931-1829
FORUM-80 Sierra Vista. AZ 602 458-3850 *24
KANDY SHACK -4 Yuma AZ 602 342-2383
TWILIGHT ZONE (ATARI) Tucson. AZ 602-790-8805 *24
ACCESS 80 BBS NH 603-434-6225
CONNECTION-80 Peterborough. NH 603-882-5041
NET-WORKS Portsmouth. NH 603-436-3461
SOFTWARE REFERRAL SERVICE 603-625-1919
ABBS Vancouver. BC 604-437-7001
CBBS Prince George. BC CN 604-562-9515
RCP/M CBBS Frog Hollow. Vancouver. BC. CN 604-873-4007
RCP/M RBBS Surrey. Vancouver. BC. CN 604-584-2643
RCP/M Terry O'Brien. Vancouver. BC. CN 604-584-2543

THE HOST Sioux Falls. SD 605-336-3935 *24
BILL-BOARD 606-371-9219 *24
NKUBBS/PMS Cincinnati. OH 606-572-5685
THE RUPPEL-SET TBBS Cincinnati. OH 606-291-9255
RCP/M SJBBS Johnson City. NY 607-797-6416
AMIS MAGIC LANTERN Madison. WI 608-251-8538
BBS IBM PC Madison. WI 608-262-4939 *24
ABBS Turnersville. NJ 609-228-1149
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GREENE MACHINE Voorhees. NJ 609-429-4542 *24
RATS Wenonah. NJ 609-468-5293
RATS Wenonah. NJ #2 609-853-8268
TARI BOARD Maple Shade. NJ 609-234-9240
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THE TARDIS BBS 609-448-1367
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CAPTAINS LOG APPLE NETWORKS 612-377-7747
CBBS Richfield. MN 612-423-5016
COMMODITIES/ABBS APPLE 612-333-8970
COMPUTER PLACE TRS 612-869-3246
CONFERENCE TREE -17 APPLE 612-854-9691 *24
ERIK'S NET NETWORKS-APPLE 612-920-3975
GOLIATH MCMS TRS 612-753-3082
HEATHKIT ZENITH 612-778-1213
KNIGHTS OF THE ROUNG TABLE 612-457-4139
JOB SYSTEM, THE NETWORKS, APPLE 612-542-9597 *24
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MASTER CONTROL 612-473-6668
MCMS MC SOFTWARE Minneapolis. MN 612-533-1957 *24
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PIRATES PLACE 612-781-9266
PMS Minneapolis. MN 612-929-6699
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TWIN CITY ATARI INTEREST GROUP 612-432-3779
UNITED RBBS 612-731-1063
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BULLET-80 Ironton. OH 614-532-6920
OHIO VALLEY BBS 614-423-4422
T-T TECH LINE Westerville. OH 614-965-4378 *24
BBS Westmoreland. TN 615-666-5887 7pm-12pm daily
BULLETIN/68 Hixon. TN 615-842-6809
DIAL-YOUR-MATCH Knoxville. TN 615-573-9748
KNIGHT-LINE Nashville. TN 615-297-6037
R/CPM Cookeville. TN 615-528-5039
TIBBS Knoxville. TN 615-573-2136
TIBBS Knoxville. TN 615-691-9558
THE BOARDWALK 615-359-2650
ABBS COMPUTER ROOM Kalamazoo. MI 616-382-0101
AMIS G.R.A.S.S. Grand Rapids. MI 616-241-1971 *24
CBM-U COMMODORE Holland. MI 616-396-7106 *24
CBM-U COMMODORE Jension. MI 616-457-5452 *24
COMMODITY TRADERS 616-731-5330 *24
CONNECTION-80 W. MI Micro Group MI 616-457-1840 *24
AMIS STARBASE 12 Philadelphia. PA 617-876-4885
BOSTON INFO EXCHANGE Boston. MA 617-423-6985 *24
BULLET-80 Boston. MA 617-266-7789 *24
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CBBS Lawrence General Hospital. Boston. MA 617-683-2119
CBBS MICROSTAR Worchester. MA 617-752-7284
DIAL-YOUR-MATCH -17 617-334-6369
FORUM-80 Westford. MA 617-692-3973
NET-WORKS PIRATE'S HARBOR Boston. MA 617-720-3600
NEW ENGLAND COMP. SOC. Maynard. MA 617-897-0346
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NATIONSERV Fairfield. IL 618-847-2291
CBM-U COMMODORE Escondido. CA 619-746-4003 *24
CONNECTION-80 Escondido. CA 619-746-6265
ONLINE CDC San Diego. CA 619-452-6011
ONLINE SABA San Diego. CA 619-692-1961 *24
ONLINE Santee. CA 619-561-7271 *24
PMS COMPUTER MERCHANT San Diego. CA 619-582-9557
PMS DATEL SYSTEMS INC. San Diego. CA 619-271-8613
PMS Escondido. CA 619-746-0667
PMS Lakeside. CA 619-561-7277 *24
RCP/M RBBS San Diego. CA 619-273-4354 *24
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Vote For The Computer Hobbyist Of The Year

by Bill Chin

As in the past years, I have been the Chairman of the Trenton Computer Festival Committee to select the best individual who BEST represents the personal computing area in the areas of hardware or software or even the betterment of the computer club community activities. I ask that you ponder the thought of such an individual who has helped or has made a worthwhile contribution to the personal computer community.

Please send your votes to me for the Computer Hobbyist of the Year 1984.

Past winners:

1982 Ward Christensen
1983 Richard Conn

Who will be the next recipient?

Send your votes/nominations to me and NOTE the computer hobbyist in the lower left corner of the envelope.

Results will be published in the July issue...and presented at the Trenton Computer Festival Banquet on April 20th, 1985.

Stay tuned...

Please write and send any questions to me:

Bill Chin
P.O. Box 2085
Clifton, NJ
USA 07015-2085

Please include a SASE if you wish a reply in 3 – 4 weeks.

Information on the Banquet and Trenton Festival are available from:

Dr. Al Katz
Trenton Computer Festival
Dept. Electronic Technology
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Book Review

HACKERS—HEROS OF THE COMPUTER REVOLUTION BY STEVEN LEVY

Published by Anchor Press/Doubleday

I have read quite a few books lately about the period of my life when we were founding the world of personal computers and were proud to be called "Hackers." This one by Steven Levy captures the spirit of the time and of the "Hacker Ethic"—that information and programs were to be shared among those who could contribute to the general fund of information. The other parts of the ethic were:

*Access to computers should be free and unlimited.

*Distrust Authority—promote decentralization.

*Hackers should be judged by their hacking, not by position, degrees, age, or race.

*You can create art and beauty on a computer.

This was before the title was degraded by nerds, to mean a thief who operates by using a computer as a burglar tool.

Steven starts his story in prehistoric days at the Tech Model Railroad Club at MIT, where the first Hackers used one of the ancient IBM 704 computers to learn and to control devices to operate the layout. Soon, the programming became more important than the trains and pure Hacking was born.

He relates the birth of the minicomputers and the extension of Hacking to the first PDP minis. Then, in the 1960s, the division began between the tech-Hackers and the anti-war radicals who wanted to destroy computers as tools of oppression.

I enjoyed reading about those days because at that time I was a slave of the military-industrial complex, writing spare parts provisioning lists in COBOL, and electronic tech manuals in English. I also raised children and flowers for fun.

Continued on page 144

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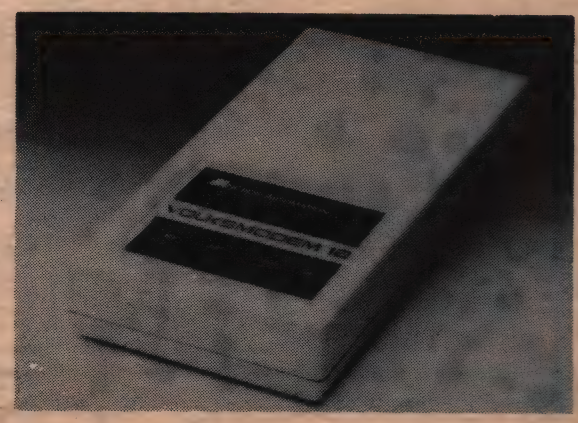

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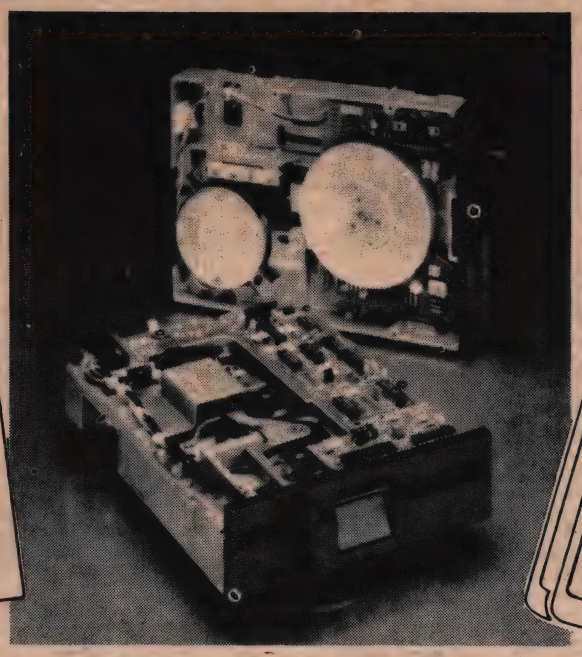

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Digital Announces PDP-11/84 Minicomputer

Digital Equipment Corporation announces a new high-end member of the PDP-11 minicomputer family for Original Equipment Manufacturers (OEMs). The PDP--11/84 is available in two variations: a rack-mount processor and a kernel subsystem for freestanding configurations. It provides PDP-11/70-class performance and total hardware/software compatibility with the entire UNIBUS PDP--11 line at less than one-third the price of a PDP-11/70.

Heart of the PDP-11/84 CPU is Digital's 15-MHz J-11 microprocessor chip set. The new central processor features the full PDP-11 instruction set including extended and floating-point instructions, sophisticated memory management, dual register set, 22-bit addressing, separate instruction and data (I&D) space, and three operating modes. It includes 2 Kbyte EEROM, 8 Kbyte direct-mapped cache, and a 32 Kbyte bootstrap/diagnostic read-only memory. Both product variations come with a minimum 1 Mbyte of memory and have ample power and space for system expansion.

The PDP-11/84 will support the full range of PDP-11 minicomputer UNIBUS peripherals. The complete range of PDP-11 operating systems, RSTS/E, RSX-11M, RSX-11-M-PLUS, RT-11, DSM-11, TAS, and ULTRIX 11, support the new CPU.

The rack-mount version of the PDP-11/84 CPU is priced from $16,000. The subsystem kernel is priced from $20,000. Quantity discounts are available.

For more information, contact Digital Equipment Corporation, Maynard, MA 01754.

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Book Review
Continued from page 142

Never in my wildest dreams could I imagine that one day I too would be a Hacker! Later, I became one of a rare breed—the APL Hacker—and still later one of the founders of the personal computer revolution.

The part about my fellow revolutionaries was most interesting but it also made me mad. So many of these books ignore the things that occurred on the east coast, south of Boston. There were many more Hackers and personal computer founders in New York, New Jersey, Pennsylvania, Virgina, Georgia, Texas and Florida than in California. Rodger Amidon is just as interesting a character as Lee Felsenstein, but only the New York/New Jersey people know about him!

Speaking of Lee Felsenstein, when I got my SOL, the first on the east coast (except for Les Solomon's) it didn't work. I called Processor Technology and yelled HELP! They didn't quite know what to do so they shipped me Lee Felsenstein, all the way to New York! I got to know him and I feel that Levy's treatment of the unusual character of this genius is sensitive and correct.

Reading about my friends Ted Nelson, Marty Spergel, Les Solomon, Bob Mash, Woz and Jobs and the old crew is particularly great for me, but reading about the Game Hackers was even more interesting because I was not involved in that phase of the industry and it was new to me.

Enough of this waltz down memory lane with Steven Levy. This book is well written and interesting enough for you to buy. It doesn't cost any more than another BASIC book you will never read. So get it and learn something about that old gang of mine!

Reviewed by Stan Veit ●

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Trenton Computer Festival

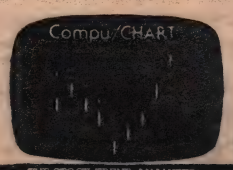
The Trenton Computer Festival (TCF), the original personal computer show, will celebrate its 10th anniversary on Saturday and Sunday, April 20 and 21, 1985.

The 10th annual TCF will be bigger and better than last year, with three times the indoor exhibit space, an expanded flea market and many more workshops. Nine meeting rooms will be used simultaneously during the festival for technical sessions, user group meetings, computer courses, demonstrations, and a computer graphics theatre. On Sunday afternoon an auction of computer equipment will be held.

On Saturday evening at the annual banquet the award for Computer Hobbyist of the year will be presented. (The 1984 winner was Richard Conn, author of ZCPR.) Featured speaker will be an internationally known person in the computer field.

TCF-85 will be held on the 210 acre campus of Trenton State College, located on Route 31, convenient to Route 1 and I-95, in suburban Ewing Township, NJ. It is a not-for-profit educational undertaking sponsored by the Amateur Computer Group of New Jersey, the Philadelphia Area Computer Society, the Central New Jersey Computer Club, the Institute of Electrical & Electronic Engineers—Princeton Section and the Department of Engineering Technology of Trenton State College.

Tenth Annual Trenton Computer Festival, Saturday April 20, 9 – 6; and Sunday, April 21, 9 – 4. General admission $7 for two days. Sunday only $5 ($3 for students and seniors,) Saturday banquet $10. Free parking and free day-care. Draped 10x12 booths – $200; flea market space $15 (2 days). For further information call (609) 771-2487. ●



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Spectravideo Begins Delivery Of SVI-328 Value Pak Home Computer System

Retail deliveries of the Spectravideo SVI-328 home computer system have begun.

The CP/M based computer is being marketed as the "SVI-328 Value Pak" and includes the company's 89-key, full stroke keyboard, SVI-904 data cassette recorder, SVI-101 "Quickshot I" joystick controller, and 10 educational/entertainment/home management software programs. The system comes loaded with 32K ROM (expandable to 96K) and 80K RAM (expandable to 144K), incorporates a Z80A microprocessor and 3.6MHz clock. It carries a suggested retail price of under $175.00.

Software titles enclosed with the system include Introduction To BASIC, Spectra Checkbook, Spectra Diary, Spectra File Cabinet, Spectra Home Economist, Spectra Type, Armoured Assault, Nomis, Spectron, and U.S. Presidents.

Disk drives and expansion cards are available as optional purchases.

For more information, contact Spectravideo, Inc., 3300 Seldon Court #10, Freemont, CA 94539.

Mention that you read about it in Computer Shopper. ●

TIMEX-SINCLAIR

Timex Sinclair Survival Column

by Mark L. Fendrick

These cold winter days can be mighty boring if you have to stay indoors, but your T/S 2068 can come to your rescue. A little imagination, creativity, and one of these products can lead to hours of fun creating graphics on your screen. Three of these packages work with a joystick, and the fourth...well, keep reading.

Multi-Draw, by Gary E. Ward, is a program which allows you to create graphics on your T/S 2068 using any Atari type joystick. It also gives you a number of options for making hard copies of your design. **Multi-Draw** is designed to copy the picture you draw with either a T/S 2040 printer, or a dot matrix printer connected via an AERCO parallel interface. The joystick is used for all functions of the program, including changing from one option to another.

The **Multi-Draw** screen consists of two areas: the drawing area, which occupies all but the bottom few lines, and the menu portion, which is a line of choices along the bottom most portion. The menu itself is in two parts. The top line is a series of boxes running from one side of the screen to the other, with a single cursor which is used to select various options. The bottom line starts on the left with the current major option displayed. Further to the right you encounter 8 different texture patterns which can be used in creating your picture. In the middle are the letters P and I which stand for PAPER and INK respectively, and are used to set the colors. The final fourteen spaces contain the user defined characters. Actually, this is only half of the user defined characters allowed. A push on the joystick switches these fourteen with fourteen more.

Options include:

Save PG - With this option, you can make a back-up copy of **Multi-Draw**. It is suggested that you make this back-up copy (for your own use only please) and put the original tape away to keep it safe.

LOAD PG — This option allows you to make **Multi-Draw** part of your programs by merging the two programs. **Multi-Draw** is written using line numbers in the 9000's so it should be easy to combine with most programs with little or no modifications.

SAVE $ — Once you have created a screen which you want to keep, this option SAVEs it to tape for you. In this manner you may create a library of graphic screens for later use.

LOAD $ — Once you have SAVEd a screen using the previous option, you may use this selection to LOAD it back, and then you may continue to work on this. This is very useful in creating complicated screens which may require more than one session at the computer to complete.

BASIC — To exit the machine code portion of Multi-Draw, and go back to BASIC, just select this option. You can go back to **Multi-Draw** without losing the screen you were working on.

CLR S$ — As the name of this option implies, by selecting it you clear the current screen and start with a new, clean one. Unless you have SAVEd the old screen to tape, it is lost.

DRAW — This is the option which will allows you to create your graphics. We will go into the operation of the program shortly.

COLOR — This option allows you to set the color of the paper and/or ink with which you will create your design. The colors won't appear on the Timex printer, but can be a factor if you are using a full size printer to copy your screen.

TEXT — If you want to add text to your graphic, select this option, and then you can type from the keyboard and have it appear in the design you are creating.

BIG PRINT — This applies to a full size printer. When using this type of printer, you have the ability to copy the screen in two sizes. Selecting this gives the larger of the two print sizes.

SMALL PRINT — This is the same as the above option, but it selects the smaller of the print sizes.

GRY PRINT — Also for the full size printer only, this option uses a procedure whereby different colors on the screen are represented on the hard copy by different dot patterns, allowing a color picture to be represented in various shades of grey, as in a black and white photograph.

COPY — this, the final option, causes the screen to be reproduced on the Timex printer (or Alphacom 32).

When **Multi-Draw** is the first LOADed, and you touch the joystick, you see a blank screen with a bottom line of characters. These characters can be used or changed to ones of your own design. (Designing your own characters is quite quick and simple.) Each one represents one character position, and can be combined in any manner to create your graphic. If you change the character, the originals are lost and you must reLOAD your original tape to have them back. If you SAVE the program after you redesign these characters, your program will have your characters. You may also enlarge a 4x3 character section of the screen and set (or blank) any pixel in the enlarged area.

I do, however, find a few problems with **Multi-Draw**. The most significant one is even discussed in the user's guide. Since **Multi-Draw** relies on *all* positions of the joystick, unless the joystick is in perfect shape, most drawing capabilities are lost. Since there is no option to use the keyboard in place of the joystick, this can be very frustrating. You should use one of the better joysticks if you plan to use **Multi-Draw**. Also, even though the program utilizes the AERCO parallel interface, I find that I cannot get a proper copy on my Gemini 10X. I get characters, but nothing similar to my creations.

Multi-Draw is available from Knighted Computers (707 Highland Street, Fulton, New York 13069; (315) 593-8219).

A second graphics package comes to us from Canaan Software in England. **Grafist**, by T.A. David, has been modified from the original Spectrum version to work on the T/S 2068. Like **Multi-Draw**, this is a machine code program to create on screen graphics. In addition to graphics, however, **Grafist** has a text section which creates moving displays consisting of large titles, and scrolling text. This application is excellent for countertop or window displays.

Grafist has a main menu which has 6 options. They are:

DRAW — This is the option you choose to do the actual creating of your screen. **Grafist** allows you to create and store up to three screens which can be recalled at will. When you choose **DRAW**, you are asked to set a number of parameters. They include; paper bright (y/n), and the color of the paper, frame, brush, pen, titles, and characters.

ENTER TEXT — This application is the one you will select to create video text displays. You may create large titles followed by scrolling text. You can set the color of the ink and paper, as well as the speed of the scrolling display.

TITLES — This will give you the ability to define and save titles which may later be used in your text or in the creation of screens.

SET PRINTER — **Grafist** has the ability to use either the T/S 2040 printer (or Alphacom 32) or a full size printer. This option will allow you to select which printer you are using. If you choose a Centronics type printer, you will be asked to set the number of columns, and then given the chance to run a printer test.

SAVE/LOAD — Once you have created your screens and/or text display, you can SAVE your work by choosing this option. You would also use this option to reLOAD any work which you had previously SAVEd.

DISPLAY/PRINT — This application allows you to display and print either your graphic screens or text display. You may display the 3 screens in rapid succession creating a short bit of animation, and you can make a video recording if you have a VCR.

Continued on page 146

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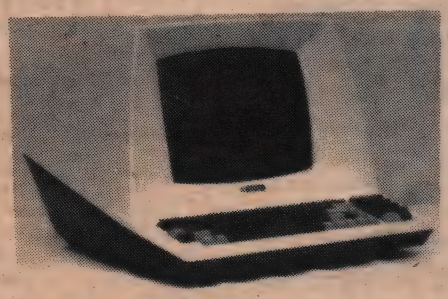

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T/S Survival
Continued from page 145

Drawing with **Grafist** is quite easy, and you can use either a joystick or the 1-8 keys on the keyboard. The keys 1-4 give you the ability to draw diagonal lines from the keyboard. You have a choice of either brush (wide) or pen (thin) strokes. You may also have the program draw circles for you, once you define the diameter. The drawing screen menu also allows you to move the picture right or left on the screen, and add titles and text within the screen. In fact, the FLASH, and OVER attributes may also be called upon. Once created you may store this screen in one of three storage positions. You may also retrieve any screen previously stored.

One of the major problems with **Grafist** though is the scanty documentation. This seems to be a problem with all of Canaan's software. The instructions are all on an insert in the cassette case, and tend to ramble without any direction. Another problem probably stems from the fact that it is a modified program written for the ZX Spectrum. I find that occasionally the characters on some of the prompts or menus are garbled. This is probably due to the Spectrum's memory is arranged in a slightly different manner. Typing CLEAR 65535 before entering the program helps a little, but the garbled prompts still appear. Finally, as with **Multi-Draw**, I cannot get a proper print-out on my Gemini 10X.

Grafist is available from T.E.J. Computer Products (859 N. Virgil Avenue, Los Angeles, California 90029; (213) 665-5111).

As I was finishing this month's column, I received **Draw II** in the mail. Written by Jon Roketenetz, a 13 year old member of a Cincinnati Timex/Sinclair users group, it is the most impressive of the software only graphics programs I have yet seen. It is written in BASIC, but is anything but slow. It is the only one which uses icons (pictures) instead of a text menu. To select the various creating options, you move a picture of a pointing finger to the picture which represents the option you desire.

Like **Grafist**, there is no keyboard entry option, just joysticks, but since it is written entirely in BASIC, it is not too difficult to modify the program to allow keyboard entry. There are seven options at the bottom of the **Draw II** screen which may be selected by moving the pointing finger to the proper icon.

Pencil — By moving the pointing finger to the pencil, you can select one of three print widths from a sub-menu.

Stamp — In the wide print mode, you have a number of predefined graphics (house, musical note, pointing finger, heart, etc.) which you can place in your drawing.

[G] — You may have a number of predefined shapes automatically drawn into your picture by choosing this option. You choose a shape (such as a circle or triangle) and define its size, and if you want it to be filled in or not, and it is automatically inserted and filled in, as you have indicated.

C — By placing the pointing finger over the **C** and pushing the fire button, you step through the colors, and you can select the color you draw with in this manner.

Garbage Pail — To erase your drawing and start a new one, this is the icon you select.

Tape Recorder — Once you have created a graphic screen, you SAVE it on tape by choosing the picture of a tape recorder, and then SAVE the screen in the usual way.

Printer — Choose the printer and you can make a copy of the current screen. You may COPY to either the T/S 2040 printer, or any full size printer. You are asked how many copies you want, so you may make multiple copies without repeating the procedure.

I was very impressed by this software, and was happy to find that I was finally able to make a copy on my Gemini 10X! There is no print driver included, so it works with my own customized AERCO driver. If a keyboard option were added this program would have everything I could ask for.

For more information concerning **Draw II** write to Peech II Productions (6333 Parkman Place, Cincinnati, Ohio 45213; (513) 351-5020).

Lastly we look at the most recent development from Zebra Systems (78-06 Jamaica Avenue, Woodhaven, NY 11421; (718) 296-2385). If drawing with a joystick or keyboard is not what you had hoped for, then you may want to consider this graphics interface/Koala Pad combination. With the Koala Pad, you "draw" with a stylus on a digitizing tablet, which is connected through the Zebra interface to your T/S 2068. As you "draw" on the tablet, the image appears on your screen.

Set up is simple; just attach the graphics interface to the expansion bus at the rear of your computer (it has a through connection so that you may piggy-back your other peripherals), plug the Koala Pad into the left socket (there are two, presumably for future developments), and LOAD the ZPAINT software and you are ready to go. The software has a feature to make a back-up copy which you should do. I had some difficulty LOADing the software, but using this feature I was able to make a copy on my recorder which LOADed every time. Once set up it is so simple to use that my 4 year old son and 6 year old daughter quickly mastered every feature built in.

The software allows two screens from which you can switch back and forth, SAVE, LOAD, or copy to and from. The Koala Pad has two control buttons which you use to control the drawing process. To draw all you do is press the draw control button, and "draw" with the stylus on the tablet. As you move the stylus across the tablet, the results show on your screen.

Across the bottom of the screen is the command menu which allows you to select a number of drawing options. They are activated by depressing the Command/Select button on your pad.

B — This stands for Border and by pressing the Command/Select button you step through the colors until you come to the one you want for your border.

P — This stands for Paper and does the same as the above option.

I — This allows you to choose the Ink color as with the

Continued on page 148

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We recently participated in a buyout of Shugart's finished goods inventory of these drives. Brand new in the original factory packing and guaranteed by us for 90 days. These 5 megabyte drives are considered by some to be the most reliable in the industry. These units directly replace a ST506 or similar drive.

When installing your system's first hard drive, a hard disk controller card and appropriate software are required. For an IBM-PC with a 50 or 60W power supply, you will need a 130W supply.

Performance Specifications

Formatted (33 sectors track)	
Per Drive	5.40 Mbytes
Per Surface	1.35 Mbytes
Per Track	8.45 kbytes
Per Sector	256 bytes
Transfer Rate	5.0 Mbits sec
Access Time	
Track to Track	16.2 msec
Average	99 msec
Maximum	215 msec
Average Latency	8.33 mesec
Start Up Time (Typ)	12 sec

Functional Specifications

Cylinders	160
Tracks	640
R W Heads	4
Disks	2
Index	1

DC Voltage Requirements:
+12Vdc ± 5% 1.8 A typical (4.0A max. starting for 6 sec.)
+5Vdc ± 5% 0.9A typical (1.5 A max.)

Ask about quantity pricing. **$149.00**

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Power One G5-35/OVP, 5V@35A, OVP preset @6.2V, 17"x5", 18 lbs.	$70.00
ACDC OEM 5N17-1, 5V@17A, 10"x5"x5", 14lbs.	$45.00
Power Components C-611, 5V@10A, 13"x3"x4½, 9 lbs.	$25.00
Trygon LBS6-24-OV, 4.8-6.8V@24A, 6"x17"x8", 36 lbs.	$60.00
Tokin ST0510-S2, +5V@10A switcher 8½"x4¾"x1¾", 2 lbs.	$30.00
Sanyo 5V@6A Switcher 7½"x4"x1¾", 1 lb.	$25.00
Lambda LXS-CC-5-OV, 5@16A, 5"x5"x9.25", 15 lbs.	$45.00
Lambda LXS-D-5-OV, 5V@27.5A 7½"x7½x9¼", 22 lbs.	$60.00
Sorenson SSD5-30, 5V@30A swticher, 5¼"x3½"x10¼", 6 lbs.	$75.00
Sorenson SSD9-50, 9V@50A swticher, 7½"x5½"x12¼", 13 lbs.	$175.00
Standard Power 200 B 12, 12V@5A unregulated 4½"x8¼"x5½", 12 lbs.	$20.00
Dacom 2489-01-C, 12.5V@1A unregulated 5"x5"x3", 2 lbs.	$10.00
ACDC 15N5-1, 15V@5A, 10"x4"x5", 6 lbs.	$75.00
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Sorenson SSD24-8.5, 24V@8.5A 5¼"x3½"x10", 5 lbs.	$90.00
Atalla CP 338, +5V@2A, OVP @6.2V, +12V@.3A, OVP@15V, −12V@.15A, 8"x3½"x4½", 4 lbs.	$18.00
Power General 3040-1, 5V@3A, 12V@2A cont, 4½A peak, switcher, 5"x3"x½"	$79.00
Astec AA11261, 5V@6A 28V@1A, unregulated switcher, 7½"x4½"x2"	$50.00
Compower 70040 +5V@3A, +12V@5A, −12V@.1A, 5"x10¼"x2"	$50.00
Osborne Power Supply	$25.00

DISC DRIVES:

- Tandon TM 502 12 megabyte unformated $325.
- Syquest SQ 306R Removable 3" 5 megabyte ST506 type interface. $295.

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SURPLUS Tandon TM 100-4, 5¼", double sided, 96TPI, 80 track, 3 msec. $139.

SURPLUS CDC BR8B2A, 5¼", double sided, 96TPI, 80 track, 3 msec. $109.

SURPLUS Xebec 1410 Hard Disk Controllers $175.

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Televideo 806, Six User, Z-80A based. Boards are assembled with all TTL parts and conectors in place. There are sockets on board for one Z-80A CPU, four Z-80A SIO, two Z-80A CTC's, one 2532, eight 4164's one 1793, one 2143 and one 1691, however we do not include these chips. AS IS: **$25.00** WORKING: **$75.00**

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No documentation available through us on the, 801, 802.
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	9S/P	15S/P	[3]25S/P	37S/P
IDB DSubminiature	3.25	3.75	6.00	8.50

	10	16	20	26	[4]34	40	[5]50	60
IDE CardEdge	3.00	3.00	3.00	4.00	4.25	4.50	4.50	8.00
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IDM Header	N/A	N/A	5.50	6.25	6.75	N/A	7.50	N/A

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5¼" S/S, 10 Hard Sec, D/D	107/1D	28.50	22.80
5¼" D/S, Soft Sec, D/D	104/2D	38.25	30.60
5¼" D/S, 16 Hard Sec, D/D	107/2D	38.25	30.60
5¼" D/S, Quad D, 80 Track	204/2D	55.50	33.30

NOTE: All Diskettes come Ten (10) to a box. The box is a plastic library box. Quantity pricing: Ten boxes must be purchased but they may be mixed types.

CAPACITORS:

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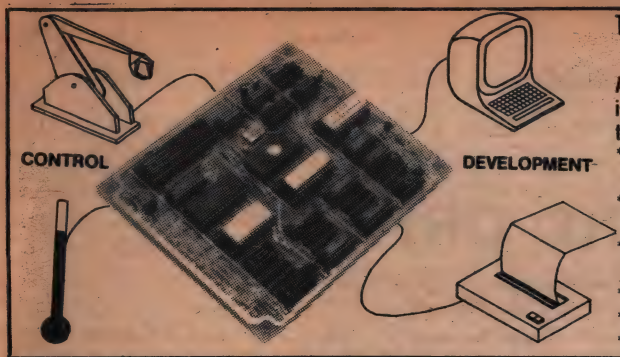

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T/S Survival
Continued from page 146

paper and border selections above.

DRAW/ERASE — This is a toggle type selection, and allows you to place your tablet in either DRAW or ERASE mode. It is just as simple to erase something you want to change as it is to create it.

PEN/BRUSH — This is also a toggle which allows you to select either a thin (pen) drawing line or a thick (brush) stroke. The pen is one pixel wide and one pixel high. Brush is five pixels by five pixels.

LINE — This choice will allow you to define the end points, and have the computer connect them to create a straight line.

CIRC — Similar to the **LINE** command above, except this time you define a circle. By first placing the cursor at the circle's center, and then on the desired edge, the computer will draw a circle using those reference points.

V&H, VERT, HORZ — This selection determines what kind of lines you can create. When **V&H** is selected, all directions are valid, and lines and curves of any shape and direction may be drawn. Choosing **VERT** causes the computer to accept only vertical motion while ignoring all other directions. This causes perfectly straight vertical lines to be drawn. The **HORZ** feature works the same way for horizontal motion, creating perfectly straight horizontal lines.

COMMAND — From this option you may enter one of nine keyboard commands. They are:

copy — gives a hard copy on the T/S 2040 printer. (No provisions are made for a full size printer at this time.)

cls — clears the current screen.

write — allows you to enter text into your graphic.

lefty — swaps the position of the Draw/Erase and Command/Select buttons so that lefties may use the tablet in a natural, comfortable position.

store — copies the current (active) screen to the other (inactive) screen.

restr — copies the inactive screen to the active screen.

exchg — causes the active and inactive screens to swap positions.

save — causes the active screen to be SAVEd to tape.

load — LOADs a screen from tape into the active screen.

The only drawbacks to this package are the lack of full size printer capabilities, and the amount of pressure needed on the tablet. If a constant pressure is not maintained, the tablet has a tendency to cause unwanted spots to appear on your screen. A little practice, however, and this becomes second nature.

The package comes with a thirty page manual, interface, Koala Pad, stylus and ZPAINT software.

When contacting these companies be sure to mention that you heard about it here in **Computer Shopper**. ●

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Software Reviews For The Timex 1000/1500/2068

by Richard Burckhardt

Appointment Calendar— $9.95

Each of the four programs reviewed came on a plain white cassette tape with one or two pages of dot printed instructions and enclosed in a baggie. Although the baggie might turn some people off, the prices of these small business programs justify the use of the dreaded plastic bags. These are not high-priced programs with thick documentation. These are relatively simple programs for an inexpensive home computer.

These programs are for a one or two-person business, such as a specialty gift store or book shop with a limited number of items for sale. The first to be reviewed, Appointment Calendar, is used to keep track of appointments. You are limited to eight per day for up to 31 days. You cannot carry over to another month.

I had trouble loading these programs. I used a Radio Shack CTR-80A computer cassette recorder and this was the first time I had ever had problems loading a program into my Timex/Sinclair 1000 with it. By turning the volume down very low, I got them up and running.

All of these programs run automatically upon loading. This allows you to save the programs on tape with variables intact for use at a later time. This can lead to some minor problems, as I will discuss later.

You are presented with the Heath logo and instructed to type in the name of the month you are using. With this done, the screen displays a menu of four choices: 1) Enter appointments, 2) Look at a date, 3) Save calendar to tape, and 4) Print calendar.

The options sound simple and are. That's the beauty of this program. Option 1 allows you to enter up to eight appointments of 32 characters

Continued on page 151

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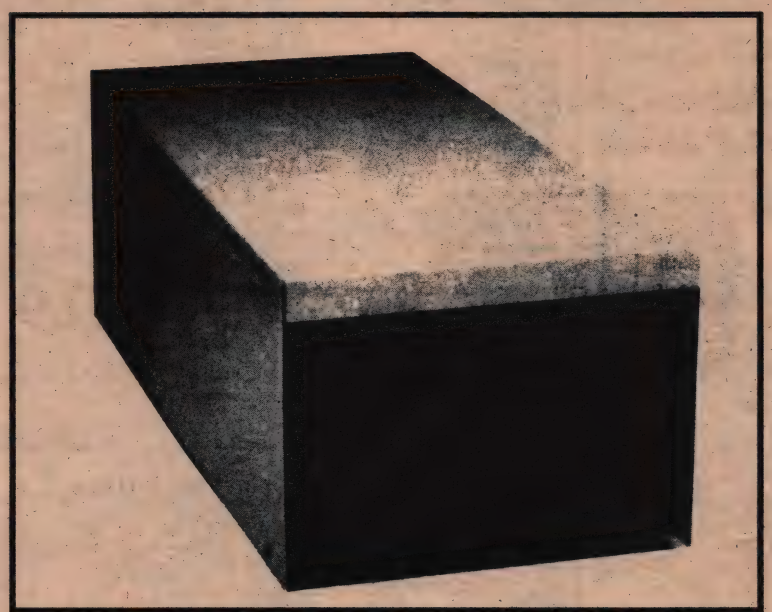

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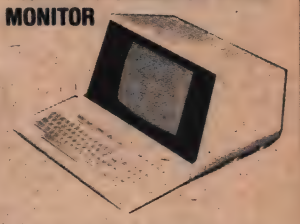

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Software Reviews
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each for any given day of the month. Option 2 prompts you for the date you wish to inspect, produces a listing of all of your appointments for that day, and then allows you to edit or delete any appointment line. You do have to make sure that your lines don't break on the 32-character screen, because the extra characters will be lost. This option also allows you to print a hard copy of one day rather than the entire month as in Option 4.

Option 3 saves the program and its variables to tape under the name of the month. Again, I had some problems here. The program seemed to save to tape fine, but considerable volume juggling took place before I could get the program to reload. Several times it appeared to reload, but would bomb at line 240. Typing GOTO 220, as is suggested in the instructions resulted in more error messages. Apparently, data was lost while reloading. After adjusting the volume several times, it loaded and ran perfectly.

My biggest complaint is that you have to save the entire program to retain data. It would be much faster to simply save a data file. Instead, you have to sit there staring at the screen, waiting for the entire program to save. It makes for a lot of wasted time. Unfortunately, all of these programs use this method.

That's all there is to Appointment Calendar. It's simple and easy to use. The single page of instructions is more than sufficient.

Sales File—$14.95

Sales File is available in 16k or 64k. The 16k will hold up to 150 products, their wholesale and retail prices and 25 accounts, while the 64k version packs a whopping 600 products and 100 accounts. It maintains your inventory automatically or manually, keeps a record of sales tax, and can be used as a cash register, complete with sales slips. The price range is limited to $9999.99. Each product name can be up to 20 characters long and each account name (payable or receivable) can be up to 25 characters. You can print out a list of products, accounts and inventory.

The program prompts you to enter the sales tax for your area. After doing this, you are presented with the main menu. Your choices are: 1) Change or add products, 2) Change or add prices, 3) Run sales slips, 4) List products, 5) List accounts, 6) Inventory, 7) Look at totals, and 8) Save on tape.

Using options 1 and 2, you input your stock items and their wholesale and retail prices. Option 6 is used to add or subtract the number of each item in your inventory, as well as provide you with a listing or printout of the inventory. Option 3 allows Sales File to do your bookkeeping. It will total your sales slips and keep your inventory up to date. You are given a choice of entering your sales slips manually or using the cash register mode to print them out automatically. After making your choice, you are prompted for an account name, a product number, and how many were sold. The computer prints the retail and wholesale prices, along with sales and tax totals on the screen after each entry. If you chose the cash register mode, you also get a printed sales slip.

Option 4 will list or print out your products and their retail and wholesale prices, while option 5 gives you a video or printed listing of your accounts and their retail and wholesale information. Option 6 is mentioned above.

Option 7 lets you look at your tax, retail, wholesale, and profit totals. These are maintained automatically through option 3.

Option 8 lets you save your program, variables and all, to tape so that you can load it and run it at a later time with all information intact. You choose the name for the saved program, set the recorder and hit <ENTER>.

This program is a little more complex than the appointment calendar, but it also does a lot more. I'd like to have seen a little more documentation for this one than the two pages provided.

Invoice Control—$14.95

Invoice Control is designed to keep track of invoices for a

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Software Reviews
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small business. The two pages of documentation say that it is self-adjusting to the amount of RAM in your system and that a 16k system will hold 20 invoices of five lines each, while 64k will hold 120 invoices of 10 lines each. This makes its use with a 16k system seem sort of silly. I doubt that many businesses can make it with such a limitation.

As with the previous programs, Invoice Control runs automatically upon loading and presents you with the Heath Computer Services copyright notice. There is a difference, however. This one includes the name of the writer of the program, Mark L. Fendrick, Computer Shopper columnist. As a matter of fact, questions about the program are directed to Mr. Fendrick in the documentation, rather than to HCS.

You are instructed to enter the name of your company, your street address, city, state, zip code and phone number. This information is at the top of any invoices you print. If you save the program to tape for further use, this information is saved with it and the inputs are bypassed when the program is reloaded. After entering these, you are presented with a 9-option menu: 1) Enter new invoice, 2) Invoice inquiry, 3) Invoice listing, 4) Accounts payable, 5) File maintenance, 6) Enter additional payments, 7) Account records, 8) Change invoice heading, 9) Save data.

Option 1 allows you to enter new invoices. You are asked for the number of the first invoice. You have to enter something here, otherwise the program produces an error message. After you enter a number, additional numbering is automatic, with each invoice one higher than the previous. Information on your customers, including the number of items purchased, a description and item price are asked for. The computer than totals the purchase and asks if the information is correct. If it is, you are asked if you would like to enter additional items. If it is not correct, you are allowed to re-enter the information. This is where I noticed a difference in what was happening on the screen and what was in the documentation. The documentation tells you to enter "I" to re-enter a line and "C" to continue to the next line. The program asks you for a simple "Y or N" answer after asking if the information is correct.

When you are finished, you enter "0" (zero) for the quantity. You are prompted for the percentage sales tax that applies. The sales tax is then computed and a sub-total is shown. If payments or deposits have been made, you are asked to enter the amount which is deducted from the sub-total and a balance due is shown. You are then asked if you want a hard copy. If you do, an invoice with your company name and address is printed with the above information. If not, you are asked to choose between entering another invoice or returning to the menu.

Option 2 lets you search for invoices by number. Upon entering the number, the computer goes into fast mode and prints the complete invoice on the screen and on the printer if requested. If the invoice is not found, it is indicated on the screen.

Option 3 provides you with a list of invoice numbers and the names of the customers. This listing is only provided on the screen. A printout option would have come in handy here for reference purposes.

Option 4 provides you with a listing, video or printed, of your accounts payable, the invoice number, account name, payables for each account, and the total of the payables are given.

The next option is for editing invoices already entered. You are able to change any of the information on your invoices one section at a time. You are asked if you want to change the name, address, city, state and zip or the lines of product information and prices on the invoice. If no changes are needed, you can return to the menu.

Option 6 lets you post additional payments or deposits to any of your invoices. You call up the appropriate invoice by number and then enter the additional payment. Then you have a choice of repeating the procedure or returning to the menu.

Option 7 provides a history of a single account or all of them. You are prompted for the account name or just <ENTER> for all invoices. This history includes a listing by invoice number with the invoice amount and amount due for each, as well as the total of the invoice amounts and balance due. Again, you are given the option of repeating the procedure or going back to the menu.

The eighth option allows you to re-enter your company name and other heading information originally entered when the program was first run.

The final option allows you to save the program and your invoice information to tape in the same manner as Sales File.

Once again, I would have liked to have seen some additional documentation. This is also a fairly complex program and some illustrations would help the user considerably.

Cash Register 16k—$9.95

Cash Register is similar to the cash register mode in the Sales File program. It turns your computer into a cash register capable of figuring daily totals and sales tax along with printing sales receipts with your company name and date.

Upon loading, you are asked to input the sales tax percentage as a digit, 4 for 4 percent, for example. Then you are asked to enter your company name and the date and are given the choice of printing sales receipts or not. The Timex 2040 printer would be ideal for this purpose because the narrow paper is receipt-sized.

You are then asked for the price and quantity of the first item. As each item price and quantity is entered, the totals, including total cost, sales tax, and grand total, are printed on the screen with the option of entering another item, clearing the register for a new customer, or looking at daily totals.

Conclusions

For the most part, I found these programs to all be of exceptional value for the price. I had a few problems with Invoice Control, however. For some reason, the first three times I attempted to run the program, it bombed after a few entries, producing those hated error codes in the lower left of the screen. What caused the crashes is still a mystery. The only thing I can figure is that information was lost during the load, which leads me to another conclusion—something besides tape storage should be used with these programs. A wafer drive or floppy system would make these truly practical software packages. For instance, few people are going to want to wait five minutes for the Appointment Calendar to load from tape to check their schedule. It's a lot easier to just look at a paper calendar. However, it might be worth the effort if it just took a few seconds. Sales File and Invoice Control take even longer to load, so the benefits of an alternate storage system are even greater. RAM pack wobble is also a problem because of potential loss of data. I lost data several times due to this. Some sort of fix for this, such as internal memory or special wobble-proof cables, would be suggested.

But, getting back to the software itself, support appears to be limited to the mail. A phone number for Heath is not included anywhere in the documentation or the packaging. Instead, Heath's address is tacked onto the end of the documentation of Appointment Calendar, Sales File and Cash Register, while Fendrick's address is listed at the end of Invoice Control. When you consider the prices, however, I suppose phone support would be asking a lot. I would still like to see a little more documentation.

Overall, I would rate these as solid software for the Timex/Sinclair line. For someone wanting simple, inexpensive record keeping for a small business, these programs are worth checking into.

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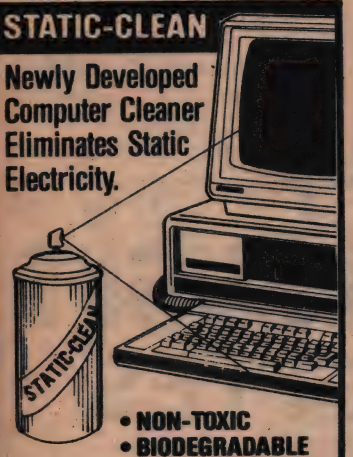

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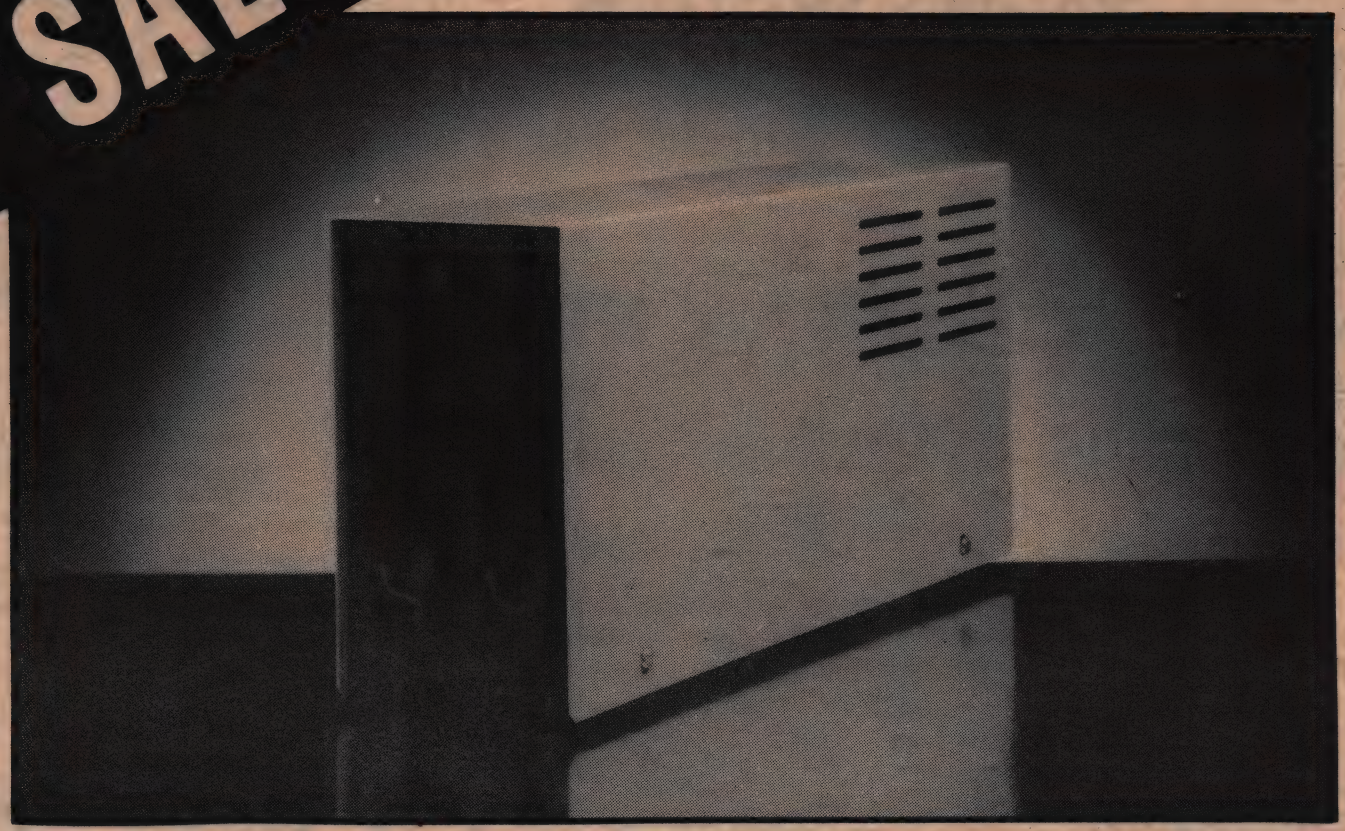

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HEATH/ZENITH

Exploring The H/Z-19 Character Graphics Set With Pie 1.5

by George M. Ewing

Like many ideas for articles, this one started with an argument. A knowledgeable engineer, intimately familiar with all the arcane inside workings of the H-89 and its family of Heath/Zenith cousins, told me flat out that "You can't use PIE as a graphics editor!" Now, this is a pretty extreme position. A famous science fiction-writing colleague of mine postulated a law that says, in part, "When an aging and eminent scientist or engineer says something is possible, he's probably right; when he says 'it can't be done,' he's almost certainly wrong." What my friend probably meant was, "It's too *inconvenient* to use PIE as a graphics editor; there are much better and more efficient, albeit more expensive, tools for the job." This is still only partly right, but at least sounds more reasonable.

As it turns out, you can, indeed, use PIE 1.5 to make up screens of graphics for the H/Z-89 and other machines using the H-19 character set, if you can live with some limitations:

PIE, the inexpensive screen editor by Walt Bilofsky for machines using the H-19 terminal design, is great for routine typing, and when teamed up with a formatting program like TEXT, it makes a pretty fair poor man's word processor. It is limited to 80-column pages though, so if you're trying to design graphics that will be displayed in some other way than on a 80-column H-19 or compatible screen, you may find it unsuitable. An example of this would be preparing a poster or business graph to be printed on a 132-column printer. Note that I said "unsuitable," not "impossible." It *is* possible to make up some simple graphics designs, such as a horizontal bar graph, for example, in compressed form at 80-column width using PIE, and then use another editor, such as CP/M "ED" to splice in the missing columns with a macro. This is somewhat tricky, but less troublesome than trying to do the whole thing from scratch with ED, or worse, trying to put it together at the machine language level with DDT!

Another limitation is the fact that PIE, unlike ED and some of the fancier word processors, cannot deal directly with a file longer than the number of characters that can reside in memory along with the editor itself. For example, a 48K CP/M system has room for only about 24K-26K characters, possibly as few as 12 to 13 24-line screens, though creative use of tabs and blank lines may allow stuffing in a few more. With a 64K system, the available space increases to a little more than 40K; this is plenty for simple graphs, charts and puzzles, but for something like an elaborate animation program, you may have to create the file in pieces with PIE, and then splice them together later with PIP. (I am assuming a CP/M operating system for the discussion here, as that is what I am familiar with. HDOS versions of PIE should work fine, though.)

A third major limitation is a result of the fact that the Heath/Zenith Terminal Logic Unit (TLU) has its own separate Z80 processor, and communicates with the CPU over an internal RS-232 serial link by means of a bewildering array of escape and control sequences. For example, if the letter "A" key on the console keyboard is depressed, you generate the (7-bit) octal number 141 (Hex 61, or Decimal 96). Of if the shift or "CAPS LOCK" key is also depressed, Octal 101 (Hex 41 or Decimal 65). At least six different characters may appear on the screen: a capital or lower-case letter "A" may appear either in either regular or reverse video, or if the terminal is in graphics mode you may

Continued on page 157

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Exploring H/Z-19

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get two horizontal rows of dots across the center of the 8 x 10 character matrix, again in either regular or reverse video mode. In order to be able to sue an editor like PIE and still "see what you're getting" in real time without stopping, saving the file, and typing it with TYPE or PIP, you have to be willing to embed escape sequences in the screen as you go along, and to take the terminal off line and feed it a separate escape sequence every so often. More about this in a minute, but first a recap.

The limitations of PIE as a character graphics editor include the fact that it's restricted to lines 80 characters or less in length, files can be no longer than will fit in memory along with the editor itself, and a number of embedded escape sequences must be used to get a real-time display of graphics. This last was what caused the grouchiness on the part of my engineer friend, as there IS no obvious way to embed escape sequences using PIE! Back to that in a minute.

The Great Alphabet Soup Escape

When the beginner first looks at all the TLU escape sequences in the manual, it is pretty intimidating. Besides the ASCII characters themselves in Octal, Decimal, Hex, and control Mnemonics, there are all the ZDS sequences from ZCUH to ZERV and ZXRV to ZXMP, all the ANSI ones from CRM to FETM (either SET, RESET, or N/A, of course!) and FEAM to PRCP. When you throw in additional tables for converting back and forth from ZDS to ANSI, pile on the extra sequences for the 25th line and the regular and alternate keypad modes, it rapidly degenerates into alphanumeric chaos. While you may eventually find that most of this information is useful or even essential, all a beginner really needs are the two manual pages that diagram the graphic characters themselves in asterisks on little 8 x 10 matrices, and four simple commands to get started. Remember this mnemonic:

Foolish Girl!

Mind your ps and qs!

At this point, I am going to suggest that you simplify things drastically, and disregard most of the stuff in the appendices in the manual, even though you'll want to go back to some of it later. Forget Octal, unless you have to modify existing software that was written in it. Octal went out with the 6SN7GT. Set aside the hex designations for a while, too, though you may eventually need them for debugging a screen dump utility or something. For the purpose of simplicity, I will designate an alphabetical key in this discussion with a capital letter in quotes, "A," "Z," etc. and will specify upper or lower case. There's a good reason to do this, which will become apparent in a minute. When I say "lower-case A," I mean the ASCII character "a," Decimal 97 (Hex 61).

Back to the "Foolish Girl" Mnemonic. There are four escape sequences that you really do have to memorize:

1. ESC-F—The escape key followed by an upper-case "F." This is the Enter Graphics Mode sequence, "ZEGM" in the ZDS mnemonic table. It switches the TLU into graphics mode.

2. ESC-G—The escape key followed by an upper case "G." This is the Exit Graphics Mode sequence, "ZXGM" in the ZDS mnemonic table. It switches the TLU back to regular mode.

3. ESC-p—The escape key followed by a lower-case "P." This is the Enter Reverse Video Mode, "ZERV" in the ZDS mnemonic table. In either regular or graphics mode, it causes the TLU to display all characters as black against a solid light background. There are some special provisions necessary when using this mode for both aesthetic and legibility reasons.

4. ESC-q—The escape key followed by a lower-case "Q." This is the Exit Reverse Video Mode, "ZXRV" in the ZDS mnemonic table. This cancels the reverse video mode. They are all escape sequences, F, G, p, and q, hence, the "Foolish Girl" mnemonic. Remember the "Foolish Girl" is upper-case, the "ps and qs" are lower-case. Don't ask me why the Gnomes of Benton Harbor decreed this inconsistency; I guess they were just trying to cram all the stuff they could into the TLU character set ROM.

Before setting out to explore the H-19, quickly review how the TLU display is set up. There are 2,000 characters in all, (NOT 2K or 2048!) 1,920 in a 24 x 80 array, and a separate single row of 80 at the bottom. The 33 graphics characters are formed in an 8 x 10 matrix instead of the 7 x 9 used for the alphanumerics, to avoid the "cracks between the columns" problem. The TLU writes to the screen from left to right and top to bottom sequentially, like text on a printed page from the operator's point of view. This means that in order to embed a control or escape character in a screen, it must be placed to the left of a group of characters

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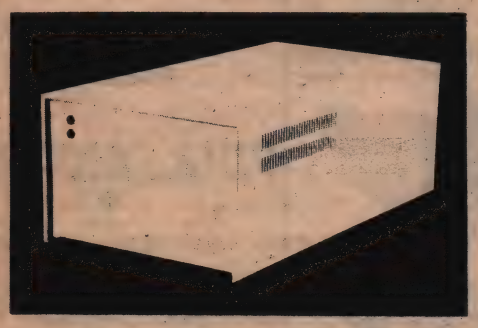

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Continued from page 157

on a line if it is to be "upstream," and to the right of the group if it is to be "downstream." If you have a block of characters that occupies more than one line, the upstream position is immediately to the left of the first character in the top row, and the downstream position is immediately to the right of the last character in the bottom row.

The first thing you should do with your copy of PIE before getting involved with a complicated design, or even some simple practice doodling and electronic graffiti, is read the "Patches.DOC" file that came on your distribution disk. You may want to turn off the feature that uses tabs to save space, as they can sometimes mess up a screen with regular columns, like a vertical bar graph. If you decide to make this patch, make sure you read the documentation, and make sure you keep track of what version you are using for a given project!

Okay, you've booted up your system, loaded PIE, and started a test file, called "DOODLE.GFX," or some such. Now what?

First, type a short message in regular upper and lower-case characters across the top of the screen. This will allow you to demonstrate that the TLU is "switching" properly from regular to graphics mode and back again later when you TYPE or print the file. Hit return, and position the cursor at the beginning of a new line. Now you must embed an "ESC-F" in the file to tell the TLU that all characters "downstream" of this cursor position are to be displayed as graphics characters instead of text, until the TLU receives an "ESC-G" sequence, when it will switch back to the next mode.

"But wait a minute," you say. "There ISN'T any provision for embedding escape sequences in a PIE file! A few control codes, yes, but PIE has already allocated the "ESC" key on the H-19 keyboard as a reverse tab; if I hit the key, all that happens is that the cursor jumps 8 spaces to the left."

True, the ESC key is already allocated. The PIE editor **does** have the ability to embed control sequences, so you can embed a "CTRL-L" form feed for an Epson or Okidata printer, for example. The technique requires that you hold down the "CTRL" key while typing first the letter "K" key and then the actual control character, which will then appear as a reverse video character in the file on the display screen, but will be invisible when the file is TYPED. This will work for all but a few characters. In the CP/M version, control "I," "J," and "M" are illegal, because they interfere with the operating system or are already allocated other functions. Fortunately, the TLU accepts a **control key plus a lower case square bracket key** as an "ESC," so to embed the sequence "ESC-F" in a PIE file, you hold down the "CTRL" key, hit the "K" key (either upper or lower case), and then the lower case square bracket key, then upper case "F" without "CTRL." The square bracket appears on the screen in reverse video, followed by the upper case "F" in regular video. Now everything "downstream" of this sequence will appear as graphics when the file is TYPED.

However, when you try this, and then type in some characters to test it, they still look like regular alphanumerics. The computer now knows that they are graphics characters, and if you save the file with a "CTRL-E" and then send it to the screen with TYPE or PIP they will be displayed as graphics, but while you're editing, they just look like regular letters. A few minutes ago, we promised you a real-time display, a "what-you-see-is-what-you-get" mode. The problem is that the TLU is separate from the Z80 on the CPU board, and the two processors only talk to each other when they think it's necessary.

In order to see the graphics in real time, it is necessary to take the TLU off line and manually force it into graphics mode. You can do this by depressing the "OFF LINE" switch, hitting the "ESC" key followed by the upper case "F" key, and then switching the TLU back on line with the "OFF Line" key. Now hit the "f-3" key, and the editor will clear the screen, and return to the top of the file, writing in the characters in graphics form. You should now also embed an "ESC-G" sequence ("CTRL" key depressed, then the "K" key followed by a lower case square bracket key, then an upper-case "G" without "CTRL") in a convenient position "downstream" of the group of graphics characters. In this way, you can mix regular text and graphics in the same file, even on the same line, so long as the graphics are deliniated by upstream and downstream embeds, and you are willing to take the terminal off line and manually force it from one mode to the next with "ESC-F" and "ESC-G."

Quite often, upper-case only text is perfectly acceptable in a graphics display, such as labels for a graph, instructions for a game screen, etc. If this is the case, you can simply leave the terminal in graphics mode all the time while editing and avoid tiresome switching back and forth; all the upper-case letters will be displayed as text, as all the letter-key or "QWERTY" graphics keys are lower case. This is NOT so for the numeric and punctuation key characters, though.

In the very same way, we can embed "ESC-p" and "ESC-q" in a PIE file to switch on and off the reverse video mode, and use those escape sequences off line to switch the terminal. Remember, to the Terminal Logic Unit, "CTRL-K + CTRL-Square Bracket" in a PIE file is the same thing as the "ESC" key. Remember though, when using reverse video, that blank lines in a large block of graphics or text will not be highlighted, nor will any line be highlighted past the right most character. In order to get an aesthetically pleasing and legible display, you may want to insert a column of characters, such as periods, down the right margin of the screen or block within the screen to get an even pattern that is pleasing to the eye.

A couple more things need to be remembered when using PIE to create blocks of graphics. The embedded escape and control characters, both the reverse video ones and the following characters in a sequence like "CTRL-K" + "CTRL-SQUARE BRACKET" + "F," while they may be invisible to the display screen when a file is TYPED, still take up space in the line, and must be taken into consideration. When editing, you can manipulate the characters and move them around in the file. When the display is sent to the screen, though, the additional spaces occupied on the line may inadvertently move other characters on that line from their intended location. This is particularly annoying in designs with a number of vertical columns of characters, such as a vertical bar graph. Remember, PIE only allows 80 characters in a line, and this includes the "invisible" embedded ones. If you have 8 characters on a line taken up by embedded escape sequences, you only have 72 spaces left open, even though the line LOOKS empty when sent to the screen! If you decided not to patch out the compressed-tab feature before starting to edit a file, you will have to be especially careful about this, as it is easy to inadvertently "eat" an invisible tab when manipulating

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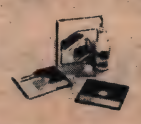

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Exploring H/Z-19
Continued from page 160

embedded escape characters, causing additional grief.

To minimize this problem, keep careful track of your embedded characters and their location. Sometimes problems can be avoided by moving the embedded characters to another column or row where they won't screw up the design, but will still perform their intended switching function. An "ESC-F" can be anywhere upstream of a block of graphics, and need not be in the most immediate left space. Until you are very experienced with this technique, it is a good idea to save your edited file fairly frequently, and look at it with TYPE. Often a dislocated line in a screen can be repaired by deleting a few spaces in the right place with the "DC" key.

QWERTY CADEF and the TVA BUS

Once you start seriously playing around with H-19 character graphics, some of the shortcomings of the manual listings become a mild nuisance, at least. The alphabetical and numerical order chart is helpful if you want to know exactly what character is displayed when the terminal receives a Hex 61, but quite cumbersome when you want to know something like "How do I draw the top left corner of a box so that it will match up with the other characters, and not leave a gap?" Then it's back to the 8 x 10 matrix charts, and lots of tedious dot-counting.

Almost any functional grouping of characters will be easier to learn than the higgledy-piggledy manual list. You can use four box corner characters arranged to form a rectangle. Make up your own Mnemonic, such as "Clockwise Draw an Exploding Figure" to remember "C," "D," "E," and "F." (All are typed in as lower-case, but are easier to remember and to label on the screen as upper-case. Remember, you can type upper-case text in a file and see the letters as you go, even when the terminal has been manually forced into graphics mode.) Adding the "A" key and the grave accent (" ") allows you to draw rectangular boxes, game mazes, etc. with a two pixel-wide line, making these six perhaps the most useful characters. Note also that there are 3 characters, (grave accent, broken line, and shifted-curly-bracket) that generate vertical lines two pixels wide, but only the first one generates a figure that matches up with the CDEF rectangular characters and the next group, the TVA-BUS.

The TVA-BUS

No, the TVA-BUS is not some super-secret computer design from the Department of Energy, nor a wheeled vehicle full of bureaucrats that shuttles between Oak Ridge and Knoxville. What it is, is my mnemonic for the rest of the rectangular line H-19 characters. With these plus the first six, you can make up all kinds of mazes, street maps, etc. without gaps. The new characters are, respectively, a left and right branching "T" connection, a cross, and an up and down branching "T." If you think of them as all "T" connections beginning with the letter "T" in "TVA-BUS" and in "left-right, up-down" order with the horizontal dash following the "A" character, it will be easy to remember them. They all form contiguous figures with the "C-D-E-F" corners and the vertical bar "grave accent" key.

A useful logical grouping is composed of the four special symbols generated by the "G," "H," "J," and "K" keys, which are not strictly graphics characters at all, but rather plus/minus sign, right-arrow, division sign, and down-arrow. You might want to include the paragraph symbol, generated by the tilde (shifted-grave-accent) key in this grouping. You can make up your own mnemonics for the other keys. You might want to group all the diagonal and "sawtooth" characters together, all the various vertical or horizontal bars together, etc.

Colored Keys and Macros

All the editing shortcuts that make PIE easy to use with text are also operative in graphics mode, allowing you to do all kinds of timesaving things with macros, put-and-take, global search-and-replace, etc. For example, if your graphics design includes a complex pattern that repeats frequently throughout your program, use the "ENTER:" + "BLUE" keys function to record your keystrokes, and then every time you hit the "BLUE" key you can insert the entire block with one keystroke at the current cursor location. You can combine this with the global search-and-replace to insert a prepared design anyplace in a file that you have marked with a special character. You can manually move embedded escape characters around in a file like any others, though they will be ignored by the global search function. The "RED" and "WHITE" key put-and-take function will allow you to record up to an entire 24-line page of graphics and text, including embedded escape characters, and re-insert multiple copies (up to 999, if there's room in the file!) anywhere in the file you want. Keeping careful track of the embedded characters, possible missing tabs, and so on becomes much more important when using macros, as a single mistake can repeat up to 999 times, and irrevocably trash a long file. Keep frequent backup copies, and ALWAYS save the file before trying a complex macro! If you end up with a mess, you can exit

Continued on page 162

CP/M EPROM PROGRAMMING SYSTEM

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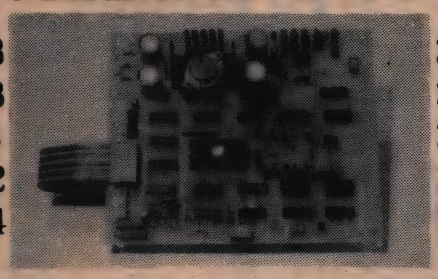
2758
2716
2732
2764



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Exploring H/Z-19
Continued from page 161

without saving with the "ENTER: + CTRL-E" sequence, and start over without wasted time.

Getting It Out Of The Greybox

All right. You've created a graphics masterpiece. Now what do you do with it? If you are going to call up your design from other software, you are going to have to add a few things to make it work properly. You may want to do this with ED, as it is easier to work with a file with absolute line numbers, and you can turn the line numbers on and off at will with the "v" and "-v" commands in ED. Testing simple animation sequences and the like is also easier from ED, as you can use the "nn...T" command to type any selected group of lines, and you can use the "nn...Z" "sleep" command to establish timing delays much more easily than with a machine-language timing loop.

If you are working with BASIC of one kind or another, you'll probably want to convert each line of your file into a PRINT statement with a line number and the graphics characters enclosed in quotation marks. A macro is probably the best way to do this. You also may have to have a complete set of embedded escape characters for each line; check the rules for your version of BASIC for the correct way to deal with control and escape characters. In a language such as FORTH or RUNIC, you can usually create a single word in the dictionary that will print as much of a file as you want. Again, the exact format you use will depend on the language variant you're using, room available in memory, etc. The RUNIC "SAY" command is analogous to BASIC's "PRINT," and requires that each block of text or graphics be set off with quote marks.

Hard Copy

If you want hard copy of a graphics design, there are basically two ways to go. You can photograph the screen, or you can use a screen dump utility and a compatible printer to print the design out on paper.

Photography has many advantages. It's quick and simple, there are no worries about software compatibility, cables, etc. By using color filters or gels and tinkering with the brightness control on the H-19 terminal, multi-color graphics can be obtained. Slides from the screen are a good way to present something like a series of business graphs to a meeting or classroom group easily. Many copy/printing shops can make a color photocopy from a 35mm or 126 slide in any size up to 8" x 10" or even 8½" x 14" for about a dollar or so. Shooting super 8 or 16mm movie film off the screen one frame at a time for simple animation is relatively easy to do, though time-consuming. For fancy work, a camera with a tripod, close-up or macro lens, and provisions for double exposures without rewinding the film is very useful. For a quick-and-easy record, a Polaroid scope camera will do nicely.

I have very little experience with screen dump utilities, as both of my printers are letter-quality, a golfball and a daisy-wheel type. Check with your local HUG, CP/M-UG, or other user group to see what software is available for your printer. I've seen packages advertised for MPI and Okidata that specifically include the H-19 graphics set, but I have no first-hand experience. If your printer has a user-downloadable character font and will support 8 x 10 matrix characters, you can probably type in the set by hand from the chart in the manual, though you may have to include some special control and escape sequences for that particular machine. A real fanatic could probably fake up an 8 x 10 set of dot graphics with periods or something that would run on a proportional-print daisy wheel, but that's out of my league. Good Luck!

Addenda

Several users have reported that while editing in graphics mode with PIE, the TLU sometimes spontaneously switches itself back into text mode. Apparently this happens when the cursor is near the right hand margin of the screen, and the "INSERT MODE" function is toggled "ON." I was able to duplicate the effect by repeatedly trying to insert a character into a line at the right margin. The "Line full" error message is displayed, and about one time in twenty, a spurious "ESG-G" is generated. If this happens, take the terminal off line, send it an "ESC-F," and put it back on line. This takes only a second, and does not seem to be necessary often enough to be more than a mild nuisance.

Two new product announcements of interest were released as this article was being prepared:

Ricoh's new computerized 35mm camera, the XRP, is now available with three pre-programmed modes for photographing a CRT screen, one for American NTSC video, one for European SECAM and PAL video, and one for monochrome and RGB computer monitors. If you're in the market for a new camera anyway, it might be worth a closer look.

ATG Systems, Inc. of Wellesley, Mass. has announced an inexpensive (about $20) screen dump CP/M utility for the H/Z-19 character set. I have not had a chance to evaluate this yet, and I'm not certain which printers are supported, though they claim it's an extensive list. ●

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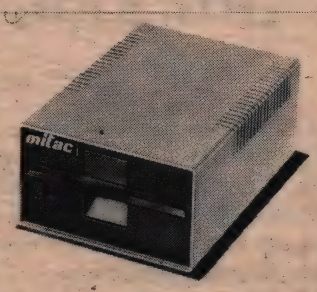

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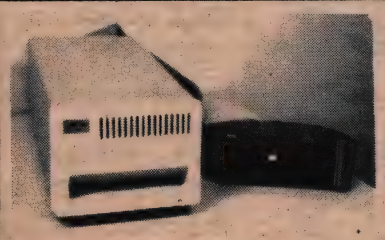

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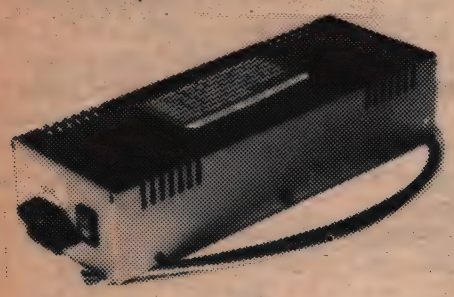

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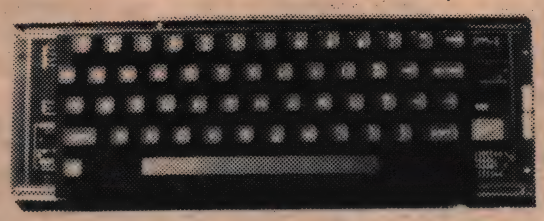

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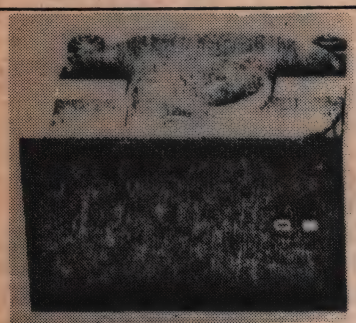

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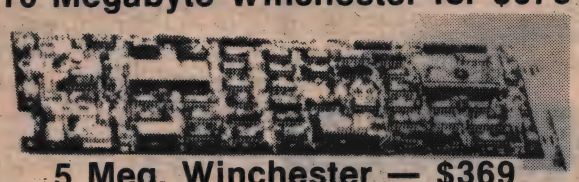

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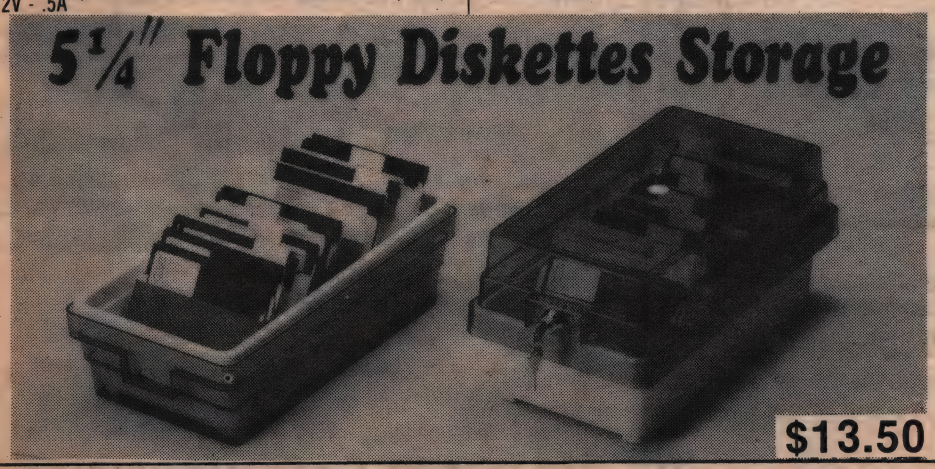

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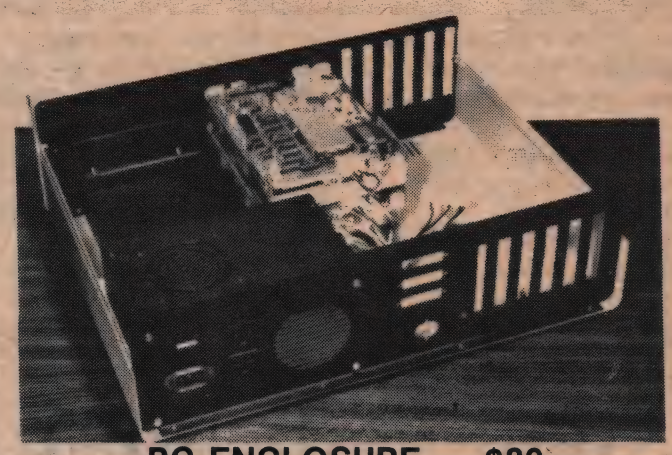

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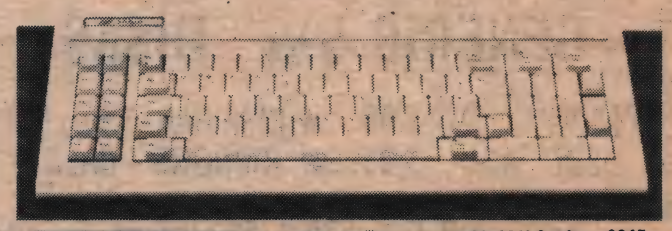

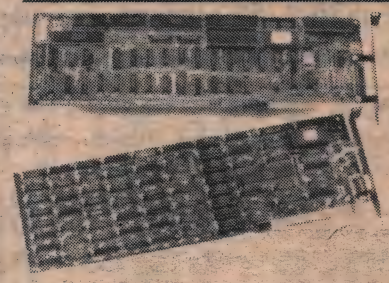

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Why Heath/Zenith?

by Harold W. Bauman

Introduction

I believe that the Heath/Zenith community should have a section in Computer Shopper! Why?

1) Heath has been involved with personal computers since the 1970s!

2) Heath/Zenith has authorized repair facilities across the country and overseas. There are 64 Heathkit Centers (now called Heath/Zenith Computer and Electronics stores) staffed with friendly trained people to help their users.

3) Factory hardware and software consultants are available five days a week at no charge other than the price of the phone call.

4) Parts are available at the stores and from the factory so that the user can do his own repairs or up-grades. No mysterious reactions to users doing their repairs. Parts lists and schematics are available.

5) After extensive evaluation the U.S. Air Force and Navy have placed large orders for computers with Zenith Data Systems for up to $300 million to go over the next five years.

6) Zenith has been quietly selling carloads of computers to other government agencies, schools and universities.

7) Zenith's personal computer sales volume has climbed by over 50% in 1984 and the volume is expected to grow at a rate of 20 to 25 percent in 1985 according to my stock analyst.

8) Zenith is the MSDOS computer with features that exceeds the IBM PC and offers price advantage as well. Zenith provides customer service beyond anything IBM can offer. BUT, best of all, Zenith will not be bankrupt like many of the other clones!

I have learned to depend on Heath to provide the service and support it takes to make buying from the company possible with confidence! They have been there yesterday—they will be there today—and they will be there tomorrow—to back up any need I might have. I have had satisfaction and service for over 10 years. Their slogan is "We won't let you fail." I have found that they mean it!

Why should I be the person to report on Heath/Zenith for the Computer Shopper readers? I have no formal connections with Heath/Zenith other than using their products for a lot of years. So, let me tell you a little about myself.

I have been exposed to all sizes of computers for over 15 years. I have worked with both computer hardware design and programmed with most languages for the science and business world. I have a BS and an MBA in engineering and business administration. I guess you would say that I am interested in computing as a tool, a hobby, and an avocation. I tell you this so that your readers will know what areas I can help in—hardware, software and application problems.

I first purchased from Heath in the 1970s when the H8 Heathkit was announced. This was a computer "hackers" dream. It had a cabinet, power supply, front panel "monitor," and a motherboard with places for 9 plug-in boards. It used an 8080 CPU board, monitor board and 8K memory board all in kit form. The front panel had 16 push button switches to enter split octal format data and displayed the input/output on a LED panel.

The first software became available in cassette form. It included an operating system, called HDOS, and Benton Harbor BASIC. This required a kit to build an interface for a cassette tape recorder. The documentation and construction was good for those days!

OH BOY! I had my own home computer! It kept me broke over the next number of years with up-grades. Add memory boards. Add the H9 CRT terminal kit (it was awful! hard to build and hard to keep running). Heath printer kit, single side, single density floppy disk drive (10 hard-sector disks), three of these drives before long. 64K dynamic memory board kit. Z-80 CPU board kit, four serial ports board kit. H19 CRT terminal kit (one of Heath's best products). H25 printer kit. CP/M operating system, and a soft-sector double side, double density floppy disk controller and drives. The list just keeps growing. It was WORTH IT! It was a hacker's fun. It was a computer that could be used as a tool to make a living with. I used it until 1983.

I overlapped the H8 with a new H/Z-100 computer with both 8- and 16-bit capabilities. As Heathkits go, this was an easy kit to build. Would you believe a 30-pound carton full of documentation? Heath has always been known for the quality of their documentation. I will attest to it. This is a wonderful computer. It has the best graphics and I could use nearly all my H8 software on the 8-bit processor. This computer is my favorite. The two processors are the 8085 and the 8088. The 8088 processor is the same as the one used by the IBM PC computer and allows the user to use many of the IBM software programs but surpasses the IBM keyboard and graphics. Also, there is no comparison of the quality of the color capability. Again, I have kept on adding to my computer. I have added a color monitor (Heath/Zenith Model 135) and a 256K memory board along with another 128K of RAM for the video color (total of 448k of RAM plus 192K RAM for video). Next, I added a 20 mbyte hard-disk and two external 5 inch 80 track DSQD floppy disk drives (640K each) for backing up the hard disk drive. Oh yes, an external modem too.

Next, Heath/Zenith added the H/Z-150 and H/Z-160 computers. I purchased a Z-150 because I needed to have complete compatibility with the IBM PC—both hardware and software. For the first time, I bought the assembled Z-150 in place of a kit. It was less expensive. Yes, you can buy the

Continued on page 169

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HAWKEYE - PC, IBM PC USERS GROUP. 385 COLLINS RD. N.E. SUITE 201. CEDAR RAPIDS. IA 52404
IOWA CITY TRS-80 USERS GROUP, C/O JOHN GREEN. P.O. BOX 1494. IOWA CITY. IA 52244
IO/WA, 7 TIMBERLANE DR.. CLEAR LAKE. IA 50428
I/OWA USER GROUP, 844 10 ST. N.E.. MASON CITY. IA 50401
MIDWEST ATARI GROUP, IOWA CHAPTER (MAGIC). 1125 3RD ST.. NEVADA. IA 50201
QUAD CITY COMPUTER CLUB, 215 MAIN ST.. #515. DAVENPORT. IA 52801
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WICHITA APPLE CLUB, P.O. BOX 4587. WICHITA. KS 67204-0587

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FIRST ATTACHE/2001 USER GROUP FAUG, C/O CHARLES RAISCH. PO BOX 2315. CORRALES. NM 87048-2315
ROCKS GROUP, GALLUP AEROSTAT SOCIETY. 1203 KIVA. GALLUP. NM 87301
THE SANTA FE COMPUTER CLUB, PO BOX 2261. SANTA FE. NM 87504

NEW YORK

ADAM MICRO-HACKERS, 236 McKIBBEN STREET. SUITE 19. NY. NY 11206
AMA, 135 W. 50TH ST.. NY. NY 10020
ANSI, 1430 BROADWAY. NY. NY 10018
APPLE BYTERS CORPS, C/O HANK KOLK. 171 TREEHAVEN RD.. BUFFALO. NY 14215
APPLE-CP/M-IBM UG, 737 EMPIRE AVENUE. FAR ROCKAWAY. N.Y. 11691
BASIS 108 USERS, C/O PERSONAL COMPUTER SERVICE. 52 JACKSON DRIVE SOUTH. POUGHKEEPSIE. NY 12603
BITS, BYTES, & PIECES UG, 1103 ARROWBEND DR.. WILLIAMSON. NY 14589
BROOKLYN COMMODORE 64 UG, C/O MALCOLM GOTTESMAN. 1735 E. 13TH STR.. BROOKLYN. NY 11229
BROOKLYN USERS GROUP, 1735 EAST 13TH STREET. APT 7N. BROOKLYN. NY 11229-1950
CPA APPLE UG, C/O BARRY LEIF. 469 SEVENTH AVE.. NY. NY 10018
CPM/APPLE UG, 737 EMPIRE AVENUE. FAR ROCKAWAY. NY 11691
CP/M UG, 345 E. 86 ST.. NY 10028
CPM USER GROUP, RT. 1 BOX 244. MILL RD.. YAPHANK. NY 11980
COCO NEWS, 3 BOHR CT.. SPRING BALLEY. NY 10977
COLOR COMPUTER CLUB OF NEW YOUR, 347 WEST 48TH ST.. NYC 10036
THE COMPUTER & INFORMATION SOCIETY, C/O DANIEL J. LUGO. 145 W. 86th St. NY. NY 10024
COMPUTER CLUB OF AMERICA AND EXCHANGE, POB 784. BRONX. NY 10473
CRAB APPLE, POB 268. WEST NYACK. NY 10994
DATA GENERAL USERS NETWORK, C/O DAVID BELLIN. POB 929. FLUSHING. NY 11354-0929
DIGITAL GROUP INDEPENDENT USER'S GROUP, POB 316. WOODMERE. NY 11598
EXPLORER 85 CLUB, C/O JUAN VALENCIA. 142-15 CHERRY AVE. FLUSHING. NY 11355
FORTH INTEREST GROUP, C/O TOM JUNG. POB 452. EAST ELMHURST. NY 11369
FORTH INTEREST GROUP, C/O TOM JUNG. 7-04 166 STREET. 8B. BEECHHURST. NY 11357
FUTURE COMPUTER PRODUCTS UG, 67 MAPLE ST.. NEWBURGH. NY 12550
HEATH UG OF NJ, C/O RALPH BRADBURN. 300 RT. 59. TALLMAN. NY 10982
HEATH UG OF NJ, (HUGNJ), C/Q RALPH BRADBURN. 300 RT. 59. TALLMAN. NY 10982
INTERCALC, POB 254. SCARSDALE. NY 10583
JERI-HUG, THE HEATH UG C/O HEATHKIT ELECTRONICS. 15 JERICHO TURNPIKE. JERICHO. NY 11753
JINSAM UG, C/O JAMES P. ISCARO. PRES.. BOX 274. RIVERDALE. NY 10463
KAYPRO UG, POB 100. MALVERNE. NY 11565
KINGS BYTE NEWSLETTER, 1063 EAST 84TH STREET. BROOKLYN. NY 11236
LION, LONG ISLAND OSBORNE NETWORK. POB 190. OCEANSIDE. NY 11572
LIST (LON GISLAND SINCLAIR-TIMEX) GROUP, 10 IDLE DAY DRIVE. CENTERPORT. NY 11721
LNW UG, RT. 1 BOX 244. MILL RD.. YAPHANK. NY 11980
LONG ISLAND COMPUTER ASSOC., POB 71. HICKSVILLE. NY 11802
LONG ISLAND NEC UG, 75 WEAVING LN.. WANTAGH. NY 11793
METRO TRS-80 UG, C/O GEORGE MUEDEN. 310 WEST 106 STREET. 15D. NYC 10025
MICROAGE ATARI COMPUTER USER'S GROUP, POB 200. HENRIETTA. NY 14467
MICRO-COMPUTER BUSINESS UG, 161 W. 75 ST.. NYC 10023
MOD 4 UG, 1578 E. 26 ST.. BROOKLYN. NY 11229
N.E.C.A., 11 DICKENS AVE.. DIX HILLS. NY 11746
NATIONAL ADVANCED STOCK/COMMODITY MICRO GROUP, LOCK BOX 407. NYC 11362
NYU DISABLED STUDENT SERVICES, 566 LAGUARDIA PLACE. ROOM 701. NY. NY 10012
NY AMATEUR COMPUTER CLUB, INC., POB 106. CHURCH ST. STATION. NYC 10008
NY SANYO USER GROUP, POB 182. TIMES PLAZA STATION. NY 11217
NORTH COUNTY TRS-80 2 & 16 CLUB, 24 WOODLAND TERRACE. LAKE PLACID. NY 12946
OLYMPIAN COMPUTER CLUB, C/O PAUL A. MULLENS. BOX 4277. APO NY 09223
PC BOOKS USER GROUP, (IBM/APPLE/COMMODORE) P.O. BOX 100. HENRIETTA. NY 14692
The PEOPLE TO PEOPLE SHUTTLE USERS GROUP -1, COMMODORE. P.O. BOX 1292. LOCKPORT. NY 14094
PET PLACE, C/O BRIAN SPECTOR. 6 CAIL DR.. E. ROCKAWAY. NY 11518
RICHARD G. WINSTON, DDS, 135 3RD ACENUE. MINEOLA. NY 11501
ROCHESTER AREA COMP, 1 LOMB MEM DR.. ROCHESTER. NY 14623
S-100/CPM USER'S GROUP, POB 106. CHURCH ST. STATION. NYC 10008
SCHENECTADY HUG, C/O T. BUDGE. 75 SANDERS. ST.. SCOTIA. NY 12302. WALTER HIPPLE 385-5660
SINCLAIR COMPUTER USER'S SOCIETY (SINCUS), POB 36. JOHNSON CITY. NY 13790
SMUG TI UG, C/O RIGH CLEMENTS. DEPT. 444. COLESVILLE RD.. BINGHAMTON. NY 13902
SOUTHERN TIER APPLE USER'S GROUP, (S.T.A.U.G.). POB G. BREESPORT. NY 14816
STATEN ISLAND APPLE UG, POB 141. STATEN ISLAND. NY 10305
SUFFOLK COUNTY COMPUTER ASSOCIATION, RT. 1. BOX 244. MILL RD. YAPAHANK. NY 11980
SYBIL'S M.U.G. UG, RT 52. CARMEL. NY 10512
SYRACUSE APPLE UG, POB 6586. SYRACUSE. NY 13217
SYRACUSE ATARI UG, 103 WOODSPATH ROAD. LIVERPOOL. NY 13088
SYRACUSE OSBORNE UG (SOUP), C/O MARTIN SHAPIRO. 601 CLAREDON ST.. SYRACUSE. NY 13201
T.I. 99ER UG, POB 544. Deer Park. NY 11729
THE BASIS GROUP INT'L, NY CHAPTER. C/O BILL BASCH. 127 MADISON AVE.. 2ND FLOOR. NYC 10016
THE DATAMERICA COMPUTER USER'S GROUP, 312 E. 84 ST. #1A. NYC 10028
THE ROCHESTER S-80 COMPUTER CLUB INC., POB 15476. ROCHESTER. NY 14615
THE SYRACUSE APPLE UG, POB 6586. SYRACUSE. NY 13217
TRI-COUNTY NY, NY CROMENCO U.G., C/O CHARLES PERRELLA. 45F RT 303. VALLEY COTTAGE. NY 10989
TRS 80 USER GROUP, RT. 1. BOX 244. MILL RD.. YAPAHANK. NY 11980
TRS-80 UG OF CENTRAL NY, 2362 EAST LAKE ROAD. SKANEATELES. NY 13152
U.A.U.G., C/O UPSTATE COMPUTER SHOP. 99 COMMERCIAL DR. 5A. WHITESBORO. NY 13492
UPSTATE 99/4A UG, POB 13522. ALBANY. NY 12212
UPSTATE NY ATARI COMPUTER ENTHUSIASTS, C/O DALE WHITNEY. BOX 232 MORRIS BLVD.. CONKLIN. NY 13748
VAN RENSSELAER COMPUTER USER GROUP, ST. ANTHONY ONHUDSON. WASHINGTON AVE.. RENSSALAER. NY 12144
WESTCHESTER FAIRFIELD AMATEUR COMPUTER SOCIETY, R.R. 1. BOX 176. POUND RIDGE. NY 10576
WESTCHESTER PET USER GROUP, POB 1280. WHITE PLAINS. NY 10602

NORTH CAROLINA

ACUSOFT ATARI COMPUTER USERS SOCIETY OF FAYETTEVILLE, PO BOX 1117. FAYETTEVILLE. NC 28302
APPLE CLUB OF FAYETTEVILLE, PO BOX 70. FAYETTEVILLE. NC 2802
CAPE FEAR COMPUTER AND HEATH USER'S GROUP, 2454 VANDEMERE AVENUE. FAYETTEVILLE. NC 28304
CAROLINA APPLE CORE, PO BOX 31424. RALEIGH. NC 27622
CHARLOTTE 99/4A USERS, 2637 CONNEMARA DR.. MATTHEWS. NC 28105
CHARLOTTE 99/4A USERS, 2637 CONNEMARA DR.. MATTHEWS. NC 28105
GEMS, GREENSBORO EIGHTY MICROCOMPUTER SOCIETY, PO BOX 10014. GREENSBORO. NC 27404
GUILFORD 99ER USERS GROUP, (TI 99/4A). PO BOX 21691. GREENSBORO. NC 27420
MICRO COMPUTER USERS CLUB, RT. 1 BOX 134-A. BOONVILLE. NC 27011
MICRO COMPUTER USERS GROUP OF RALEIGH, 5225 N. BOULEVARD. RALEIGH. NC 27604
NATAHALA COMPUTER CLUB (99'ERS), RT. 3. BOX 64-E. ROBINSVILLE. NC 28771
NATIONAL SOCIETY OF MICROCOMPUTER USERS AND GROUPS, PO BOX 8084. GREENVILLE. NC 27834
PIEDMONT TRIAD ATARI USERS GROUP, 6104 KNIGHT ROAD. GREENSBORO. NC 27410
RALEIGH COLOR COMPUTER CLUB, PO BOX 681. GARNER. NX 27259 C/O DAVID ROPER
RALEIGH OSBORNE COMPUTER CLUB, PO BOX 53754. FAYETTEVILLE. NC 28305
TACC, POB 17523. RALEIGH. NC 27619
TACS, PO BOX 7073. GREENSBORO. NC 27417-0073
TIMEX USERS GROUP, RT. 3 BOX 64E. ROBINSVILLE. NC 28771
TRIAD AMATEUR COMPUTER SOCIETY, PO BOX 7073. GREENSBORO. NC 27417
WILMINGTON TRS-80 USERS GROUP, 1605 PRINCESS ST.. WILMINGTON. NC 28401
WILSON TRS-80 USERS' GROUP, PO BOX 336. LUCAMA. NC 27851

NORTH DAKOTA

BASE COMPUTER HOBBYISTS GROUP, C/O 101-1 AVION WAY. MINOT AFB. ND 58704
GRAND FORKS IBM PC U.G., 717 IVES STREET. BUXTON. ND 58218
M.A.D. H.U.G. 99/4A, DENNIS SCHJELDAHL. 509 REEVES DRIVE. GRAND FORKS. ND 58201
TRS-80 COLOR COMPUTER CLUB, PO BOX 218. MINOT. ND 58701

OHIO

ACE (ATARI UG OF COL.), 6632 LISAMARIE RD.. COLUMBUS. OH 43229. C/O ED BILL ECKERT
AD A STAR (ATARI MICROCPU NET), C/O JACK McKIRGAN 2 WD88NG. 4749 SR 207 NE WASHINGTON C.H.. OH 43160
AIM-65 USER'S GROUP, C/O DONALD CLEM. RR #2. SPENCERVILLE. OH 45887
AKRON IBM PC CLUB, BOX 1205. AKRON. OH 44309
AMATEUR COMPUTER SOCIETY OF CENTRAL OHIO (ACSCO), PO BOX 28606. COLUMBUS. OH 43228-0606
APPLE SIDERS, C/O DAN McKEE. 5001 RELLEUM AVE.. CINCINNATI. OH 45238
APPLE-DAYTON USERS GROUP, POB 1666. FAIRBORN. OH 45324
ATARI USERS GROUP, 6895 N. HIGH ST.. WORTHINGTON. OH
BUCKEYE 99ers, 2424 MANSFIELD-LUCAS RD.. MANSFIELD. OH 44903
CCC (RS COLOR CPU), PO BOX 478. CANFIELD. OH 44406-0478. C/O ED GINNY KOMARA
CENTRAL OHIO ADAM USERS GROUP, 730 THURBER DR. APT. N. COLUMBUS. OH 43215
CENTRAL OHIO COMMODORE USERS GROUP, 107 S. WESTMOOR AVE.. COLUMBUS. OH 43204
CENTRAL OHIO 99ers, 1456 GRANDVIEW AVE.. COLUMBUS. OH 43212
CIN-DAY TI USER GROUP, PO BOX 519. WESTCHESTER. OH 45069-0519
CINCINNATI COMP CLUB, 6515 KENVIEW DR.. CINCINNATI. OH 45243
CINCINNATI COMPUTER CLUB, 1@@ CONVERSE DRIVE. CINCINNATI. OH 45240
CINCINNATI TRS-80 USERS GROUP, 5380 BAHAMA TERRACE. APT. 8. CINCINNATI. OH 45233
CINCINNATI TRS-80 USERS GROUP, 3211 MARYLAND AVE.. CINCINNATI. OH 45204
CINTUG, PO BOX 399145. CINCINNATI. OH 45239 (513) 742-BYTE
CINTUG (CINcinnati TRS Users Group), C/O LEE PENN. 6798 WEATHERIDGE DR. CINCINNATI. OH 45230
CLEVELAND DIGITAL GRP, PO BOX 17440. CLEVELAND. OH 44117
COACH (APPLE UG) OF COLUMBUS, C/O JAY WRIGHT. 1887 WILLOWAY CIRCLE N.. COLUMBUS. OH 43220
COGWHEELS CINCINNATI OSBORNE GROUP, 6404 COFFEY ST.. CINCINNATI. OH 45230
COKUG, CENTRAL OHIO KAYPRO USERS GROUP, C/O I. WEISS. 3775 DANUBE DRIVE. GROVE PORT. OH 43125
COLOR COMPUTER CLUB, PO BOX 478. CANFIELD. OH 44406
COLUMBUS CP/M-ACSCO USERS, BOX 28606. COLUMBUS. OH 43228-0355
COLUMBUS MAX80 USERS, (M.A.X.U.G.). BOX 28606. COLUMBUS. OH 43228-0355
COLUMBUS TRS-80 COLOR COMPUTER USERS, C/O GARY DAVIS. 2153 LEAH LN.. REYNOLDSBURG. OH 43068
COLUMBUS VIC-20 USERS GROUP, 169 N. VINE. WESTERVILLE. OH 43081. C/O LEN HOLLAND
COOUG, CENTRAL OHIO OSBORNE USERS GROUP, DEVRY INST.. 1350 ALUM CREEK DRIVE. COLUMBUS. OH 43209 C/O DALE BROWN
CUYAHOGA VALLEY COMPUTER CLUB, C/O BRIAN HEIN. 3053 ROHRER RD.. WADSWORTH. OH 44281
DATUG, C/O THOMAS H. MAGEE. 3360 Fair Oaks Dr. Xenia. OH 45385
DAY-ATARI, 1461 HUFFMAN AVE.. DAYTON. OH. 45403
DAYTON MICROCOMPUTER, 2629 RIDGE AVE.. DAYTON. OH 45414
DAYTONIAN COMMODORE TELE-COMPUTE USERS GROUP, PO BOX 24443. DAYTON. OH 45424
DELAWARE OHIO VIC-20 USERS GROUP, PO BOX 216.NEW ALBANY. OH 43054. C/O TOM MARTIN 855-2404
ED YORK CIN DAY USER GROUP, P.O. BOX 519. WESTCHESTER. OH 45069 513-777-0110
ENGLEWOOD COMPUTER USERS GROUP, 313 CANDY LANE. UNION. OH 45322 (513) 836-3273
GOODYEAR COMPUTER CLUB, GOODYEAR TIRE CO.. AKRON. OH 43316
IBMACSCO SIG, C/O NEIL. BOX 16086. COLS. OH 43126**NEO APPLE CORP.**, BOB CALDWELL. 10112 RIDGEWOD DR.. TWINSBURG. OH 44087
LAKE ASHTABULA IBM PC UG, POB 175. MADISON. OH 44057
LIMA AREA TI 99/4A USERS GROUP, 1513 WEST WAYNE STREET. LIMA. OHIO 45805
NEO APPLE CORPS, C/O NORM HENKE. 21750 MILLER AVE.. EUCLID. OH 44119
NEW HORIZONS, WILLIAM SAGER. 612 MEADOW SPRING. MAUMEE. OH 43537
NORTHEAST OHIO COMMODORE USERS GROUP, 5104 MAYFIELD DR.. LYNDHURST. OH 44124
OH-MI-TI, DON WOLLENBECKER. 1522 RESWICK. OREGON. OH 43616
OSBORNE USERS OF COL., OHIO INST. OF TECH. 1350 ALUM CREEK DR.. COLUMBUS. OH 43209. C/O BILL HOOKER/ DALE BROWN
OSI, NORTH COAST USER'S GROUP, 30600 NAMHAHASSET RD.. BAY VILLAGE. OH 44140
ROBOTICS USERS GROUP, APRIL LANE. COL.. OH
RUBBER APPLE USERS GROUP, ROBERT M. NEBIKER. 1870 BROOKFIELD DRIVE. AKRON. OH 44313
SAUCE, STARK APPLE USERS COOPERATIVE EXCHANGE, PO BOX 35091. CANTON. OH 44735
SANYO USERS OF CENTRAL OH, C/O ARNIE SKUROW. 5760 CRAWFORD DR.. COLUMBUS. OH 43229
SCREAMING EAGLES, C/O DAVID YAROS. 1006 2ND NAT'L BLDG.. CINCINNATI. OH 45202
SOUTHEASTERN OHIO COMPUTER SOCIETY, C/O DON SARGENT. PO BOX 1215. CAMBRIDGE. OH 43725
THE LAKE ASHTABULA IBM PC USERS GROUP, PO BOX 175. MADISON. OH 44057
THE PSYCHOLOGICAL — COMPUTER — CLUB, 2118 FOREST LAKE DRIVE. CINCINNATI. OH 45244
TIMEX-P.O.R.T.S. PORTSMOUTH, OHIO REGION TIMEX AND SINCLAIR USER GROUP, 2002 SUMMIT ST.. PORTSMOUTH. OH 45662
TIMEX/SINCLAIR USERS GROUP, 4255 S. HAMILTON. COL.. OH
TRI-STATE OSI USERS, C/O TED MORRIS. 6306 KINCAID RD.. CINCINNATI. OH 45213
TRS-80—ACSCO, BOX 28606. COLUMBUS. OH 43228
TRS-80 COLOR COMPUTER USERS GROUP, 527 MALVERN DRIVE. PAINESVILLE. OH 44077. C/O ANTHONY RUQUE
TUSCARAWAS COUNTY PERSONAL COMPUTER CLUB, C/O ROBERT D. HOBART. 231 5TH DR. NW.. NEW PHILADELPHIA. OH 44663
Z80 NEVADA COBOL USER'S (NUG), BOX 28606. COLUMBUS. OH 43228
ZORBA EQUIPMENT USERS GROUP (ZEUS), BOX 1112. ATHENS. OH 45701

OKLAHOMA

AUTUMN REVOLUTION, PO BOX 55329. TULSA. OK 74115. (918) 663-3436
BIG RED APPLE GROUP, 2301 W. MAIN ST.. NORMAN. OK 73069
OKLAHOMA LOCAL OSBORNE GROUP, PO BOX 1851. BETHANY. OK 73008
TIMEX SINCLAIR USERS GROUP, C/O BILL CASEBEER. PO BOX 372. OOLOGAH. OK 74053
TULSA AREA COMMODORE USERS GROUP, C/O CRAIG BOWMAN. 7804 N. 117TH E. AVE.. OWASSO. OK 74055 (918)272-9755
TULSA COMPUTER SOCIETY, PO BOX 1133. C/O SI HAWK. TULSA. OK 74105. 918-446-5219

OREGON

APPLE BLOSSOM, PO BOX 266. DILLIARD. OR 97432
APPLEUGENE, PO BOX 3267 EUGENE. OR 97403
ATARI COMPUTER ENTHUSIASTS, 3663 VINE MAPLE ST.. EUGENE. OR 97405. C/OMICHAEL DUNN
CP/M USER'S GROUP NORTHWEST, 1346 N.E. 28TH. PORTLAND. OR 97232
DOCTOR'S COMPUTER COMMITTEE, 2188 SW PARK PLACE. PORTLAND. OR 97205
EUGENE 99/4A USER GROUP, P.O. BOX 11313. EUGENE. OR 97440
JACKSON AMATEUR COMPUTER SOCIETY, 2355 CAMP BAKER RD.. MEDFORD. OR 97501
MICRO-CALC BUSINESS USERS GROUP, PO BOX 12039. SALEM. OR 97309
NORTHWEST SANYO ENTHUSIASTS, 5687-H SE INTERNATIONAL WAY. MILWAUKEE. OR 97222
PACIFIC NORTHWEST COMMODORE USERS GROUP, PO BOX 2310. ROSEBURG. OR 97470
PORTLAND AREA TRS-80 USER'S GROUP, PO BOX 02500. PORTLAND. OR 97202
PORTLAND COMPUTER SOCIETY, PO BOX 5494. PORTLAND. OR 97208
PORTLAND IBM PERSONAL COMPUTER CLUB, 12260 SW 124TH AVE.. TIGARD. OR 97223
PORTLAND IBM PERSONAL COMPUTER CLUB, PO BOX 2068. BEAVERTON. OR 97075
THE MICRO-80 GROUP TRS-80 USERS SOCIETY, C/O BOB WALTERS. PO BOX 1472. EUGENE. OR 97440
WILLAMETTE VALLEY COLOR COMPUTER USERS, C/O BRIAN JAMES. 1850 BAILEY HILL RD.. EUGENE. OR 97405

PENNSYLVANIA

ABACUS, 4209 LEVICK STREET. PHILADELPHIA. PA 19135
AIRPORT AREA COMPUTER CLUB, PO BOX 710. CORAPOLIS. PA 15108
APPLE USERS GROUP, NAVAL AIR DEVELOPMENT CTR. CODE 3013-MIKE MOCENTER. WARMINSTER. PA 18974
ATARI COMPUTER USERS OF TEMPLE UNIV., C/O GLENN SNELBECKER. 8905 PATTON RD.. WYNDMOOR. PA 19118
BASIC COMPUTER CLUB, 1433 13TH AVENUE. ALTOONA. PA 16601. 814-942-9565
CAPATUG, CAPITOL AREA TRS-80 USERS GROUP. 340 LEWISBERRY RD.. NEW CUMBERLAND. PA 17070. MAX WORTHINGTON
CAPITOL AREA USERS GROUP, PO BOX 673. FEDERAL SQUARE STA.. HARRISBURG. PA 17108
CENTRAL PA. 99/4A USERS GROUP, THE POINT. I-83 AND UNION STREET DEPOSIT, HARRISBURG, PA 17111
CENTRE CO COMPUTER CLUB, WILLARD BLDG. UNIV PK.. PA 16802
DELAWARE VALLEY COMPUTER SOCIETY, PO BOX 651. LEVITTOWN. PA 19058
ERIE APPLE CRUNCHERS, PO BOX 1575. ERIE. PA 16507
HARRISBURG PC USERS GROUP, 1195 FAIRMONT DR.. HARRISBURG. PA 17112. 717-652-9097
INTERNATIONAL P.C. OWNER, INC., PO BOX 10426. PITTSBURGH. PA 15234
LEHIGH VALLEY HEATH USERS GROUP, 1425 N. BROAD ST.. ALLENTOWN. PA 18104
LEHIGH 99 COMPUTER GROUP, PO BOX 4837. 1501 LEHIGH ST.. ALLENTOWN. PA 18103
LVCC, PO BOX 2952. LEHIGH VALLEY. PA 18001-2952
MONROEVILLE APPLE USER GROUP. 579 CARNIVAL DR.. PITTSBURGH. PA 15239
NACUG, C/O MARK KRAUSE. BOX 665. SPRING HOUSE. PA 19446
THE NATIONAL EPSON QX-10 USERS GROUP, C/O RICHARD SHOEMAKER. BOX 1076. Lemont. PA 16851
NITTANY USERS OF TEXAS INSTRUMENTS, 625 BERKSHIRE DRIVE. STATE COLLEGE. PA 16803
NORTH AMERICAN COMPUTER SOCIETY APPLE USERS GROUP, PO BOX 2129. WILKES-BARRE. PA 18700. C/O FRANCIS GEORGE
NORTH AMERICAN COMPUTER SOCIETY, ATARI USERS GROUP, PO BOX 2129. WILKES-BARRE. PA 18700. C/O FRANCIS GEORGE
PACS, 1613 LINCLON AVE.. PROSPECT PARK. PA 19076 (215)583-0612
PENN-JERSEY COLOR COMPUTER CLUB, PO BOX 2742. LEHIGH VALLEY. PA 18001
PHILADELPHIA AREA COMPUTER SOCIETY, LASALLE COLLEGE. BOX 312. PHILA.. PA 19141
PHILADELPHIA REGIONAL OSBORNE GROUP, PHROG, BOX 340. LAMPLIGHTER PLAZA. KULPSVILLE. PA 19443. C/O JOE GERVASE
PITTSBURGH AREA COMPUTER CLUB, 400 SMITHFIELD ST.. PITTSBURGH. PA 15222
PITTSBURGH ATARI COMPUTER ENTHUSIASTS, 111 MONAHAM STREET. ALIQUIPPA. PA 10551
SANYO OF SOUTHWESTERN PENNSYLVANIA USERS' GROUP, 29 WEST MALDEN DRIVE. COAL CENTER. PA 15423
S.P.A.C.E., ATARI USER GROUP, RD 3 WHITE DOGWOOD DR.. GITTERS. PA 17319
SPACE. C/O DENSLOW. 14 PHEASENT CT.. MECH. PA 17055
T.I. 99/4A, PITTSBURGH USER'S GROUP. BOX 18124. PITTSBURGH. PA 15236
SUSQUENANNA VALLEY USERS GROUP, ATARI. COMMODORE & TI 99/4A. C/O RAY KROHN. PRESIDENT. P.O. 5 BOX 145. DANVILLE. PA 17821
THE YORK AREA 99'ERS USERS GROUP, C/O ED GEISLER. 4385 BRAIRWOOD COURT. YORK. PA 17404
TI 99/4A USERS PHILADELPHIA CLUB, 8540 TOLBUT ST.. PHILADELPHIA. PA 19152
TI-99/4A PITTSBURGH USERS GROUP, BOX 18124. PITT.

Users Groups

SBURGH. PA 15236
TRS-80 USERS GROUP OF DELAWARE, 1109 MADISON AVE.. PROSPECT PART. PA 19075
TUG-DC, C/O GARY DITLLIO. 1109 MADISON AVE.. PROSPECT PARK. PA 19076
VALLEY ATARI COMPUTER CLUB, RD 2 COLEMAN DR.. BEAVER. PA 15009
VALLEY FORGE TRS-80 USERS GROUP, 1000 VALLEY FORGE CIRCLE. KING OF PRUSSIA. PA 19406
WYOMING VALLEY COMPUTER CLUB, 302 WYOMING AVE.. KINGSTON. PA 18704

RHODE ISLAND

THE COMPUTER CLUB, 49 DESANO DR.. NARRAGANSETT. RI 02882
NEW ENGLAND 99'ERS, 76 HERSCHEL STREET. PROVIDENCE. RI 02909
RHODE ISLAND COMPUTER HOBBYISTS, PO BOX 599. BRISTOL. RI 02809
TRI STATE USERS GROUP, PO BOX 457. LINCOLN. RI 02864

SOUTH CAROLINA

CHARLESTON COMPUTER SOCIETY, PO BOX 5264. N. CHARLESTON. SC 29406
COMMODORE UPSTATE USERS, P.O. BOX 785. EASLEY. SC 29641 (803) 859-5435
COMMODORE USERS SOCIETY OF GREENVILLE, C/O HORIZON RECORDS-HOME COMPUTERS. 347 S. PLEASOUTBURG DR.. GRENVILLE. SC 29607
GREENVILLE APPLE USER GROUP, PO BOX 5131. GREENVILLE. SC 29106
GREENVILLE AREA HOME COMPUTER CLUB, C/O CHARLES E. GARDNER. 317 ELAINE AVE.. TAYLORS. SC 29687 (803)244-3243
LORDS OF BASIC USERS GROUP, C/O ROB WHISONANT. PO BOX 459. LANDSON. SC 29456
MIDLANDS 80 COMPUTER CLUB, PO BOX 7594. COLUMBIA. SC 29202
NONAME APPLE CLUB, C/O JAMES SUMNER. 80 DUNNEMANN AVE.. CHARLESTON. SC 29403
PIEDMONT 99'ers USERS GROUP, PO BOX 5921. GREENVILLE. S.C. 29606
THE COMPUTERNIKS, C/O USC CC BOOK STORE. PO BOX 1954. CONWAY. SC 29526

SOUTH DAKOTA

SIOUX FALLS AREA HUG, C/O LORIN DOBSON. 2001 S. SPRING AVE.. SIOUX FALLS. SD 57105
SIOUXLAND 99ERS UG, 2310 S. COVELL. SIOUX FALLS. SD 57105

TENNESSEE

APPLE SOFTWARE TURNOVER, PO BOX 716. FAYETTEVILLE. TN 37334
ATHENS 99/4A COMPUTER USERS GROUP, PO BOX 309. ATHENS. TN 37303
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Why Heath/Zenith
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factory-built version for less money than the Heathkit. More important, it is less expensive than the IBM PC similarly configured.

My Z-150 came with 320K RAM on one board, two one-half high 5 inch floppy disk drives and a color/graphics capability along with two serial ports and a parallel port. It also had outputs for composite and RGB video. This is a standard configuration. Compare this with the IBM PC. The Z-150 comes with an eight slot motherboard that has a minimum of circuitry. This backplane supports the IBM bus but it does not have the central processor, memory, etc. on it. Therefore, there are few limits on the possibilities for future enhancements to improve on the basic IBM PC design that it emulates. A different microprocessor, higher clock speed, better graphics, higher memory capacity, etc. are easily implemented by just changing a plug-in board. The IBM motherboard contains much of this circuitry. Thus, the H/Z-150 (H/Z-160) is the most flexible Heath/Zenith computer since the bus oriented H8 that was introduced back in the 1970s.

The backplane has eight IBM PC/XT compatible slots that can provide space for many up-grades. My standard floppy disk model has four of these slots in use—disk controller, video card, central processor board, and a 320K memory board. The power supply has a rated output of 168 watts, so the computer can have all eight slots filled (even a hard disk) without the need for an external power supply. Compare that with the IBM PC. All-in-all the H/Z-150 is a "hackers" computer like the H8, BUT it is a really useful TOOL for any business as well.

Each of the Z-150 boards has more than one function. The central processor card also contains the audio generator and amplifier for the computer speaker. The video board provides color-graphics and has both outputs for NTSC (National Television System Committee) composite signal and RGB (red-green-blue) signal for monochrome or color monitors. It is functionally compatible with the IBM color-graphics board. The disk controller board handles the two built-in disk drives and it has a second output connector so that two external drives can be added. It also provides the two RS-232C serial port outputs. The memory board, with

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its 320 RAM. supports the parallel printer port.

There are two main differences between the Zenith and the IBM PC. First, the BASICA uses the IBM ROM for part of its program. The Zenith uses Microsoft's GW-BASIC which is an almost perfect emulation of the IBM BASICA, but it is entirely contained on a disk. I could not find any major software that was designed for the IBM BASIC that would not work with GW-BASIC. Second, the most persistent complaint about the IBM PC concerns its keyboard. (IBM has changed the keyboard design for the new IBM AT computer.) Zenith has kept the touch-typist in mind when they designed their keyboard. I could write an entire article on the keyboard subject. Maybe some readers would like one.

I have added an internal 10 mbyte one-half high hard-disk to my Z-150 along WITH the two internal floppy drives at a cost of less than $675. I have added a 320K RAM multi-function board for under $325. I have installed the circuit board for the Microsoft's Mouse cursor controller. These have all provided a good chance to test how compatible the Z-150 is using hardware designed for the IBM PC. It worked fine in each case. However, my main usage for the Mouse was with Microsoft's WORD wordprocessor which I did not like. I have eliminated them both.

Conclusion

I do not want this article to become a history lesson or a review. I would like it to be an introduction to a Computer Shopper section for the Heath/Zenith users. Such a section could be used to explain how the users can repair, upgrade and/or buy Heath/Zenith computers and supplies to save money and time. It can keep the readers up-to-date with software and hardware that will work with the H/Z equipment without paying Heath/Zenith prices. It will allow the readers to shop around for the best price. I have touched on a few ideas. I am so close to the forest that I cannot see the trees. I need the Heath/Zenith users help.

Please write to me, c/o Computer Shopper, and tell me what you would like to see in YOUR Heath/Zenith section of Computer Shopper. If you would like an answer to any question, please enclose a stamped, self-addressed envelope. I will provide an answer, where required, individual or in an article depending on how general the subject is.

The requests can be on anything—software and hardware reviews, modifications, repairs, questions about public domain software, etc. You can submit any items that you would like to share with the other readers as well. I just want to make sure that these articles are fulfilling your needs! Computer Shopper's Heath/Zenith section must become the Heath/Zenith user's part of the magazine! I will await your letters and give you a report on the letters in a future article. Thank You for your help! ●

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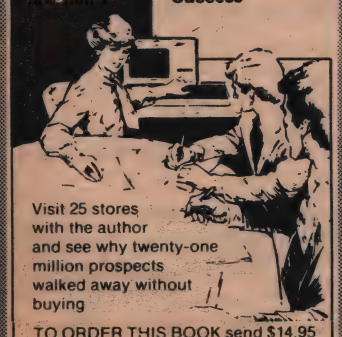

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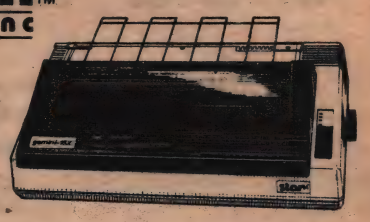

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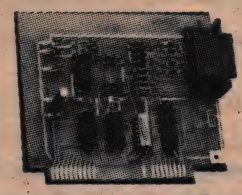

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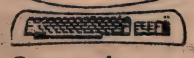

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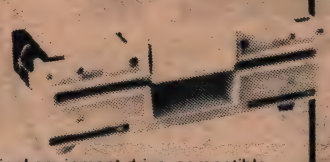

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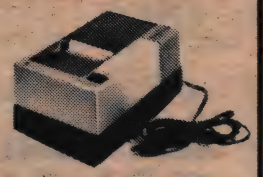

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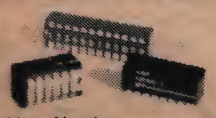

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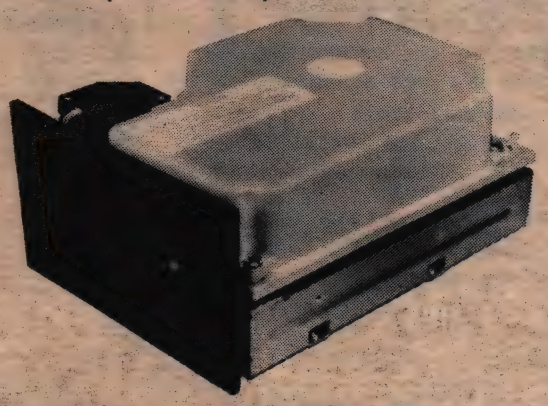

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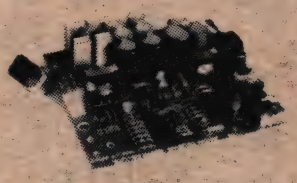

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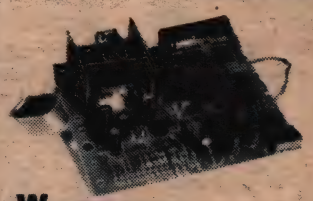

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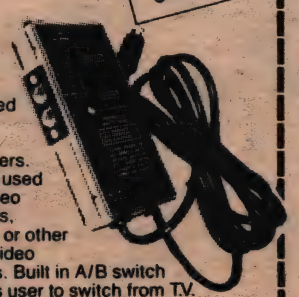

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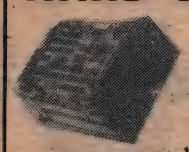

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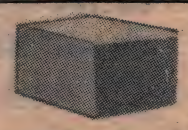

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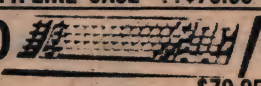

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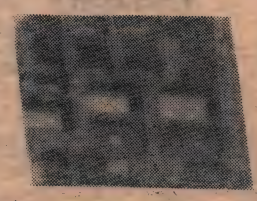

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18 VAC @ 22VA
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USER PORT CONNECTOR for both C-64 and VIC-20! GOLD 12/24 pin solder tail connector $2.25
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Wye Kit for 2 Half Heights in a std drive case. 2 male pwr plugs & 1 female socket w/wire $3.75

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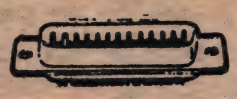

20 Terminal $1.45
34 Terminal $1.90
(For Disk Drives)

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Female $1.25
DB25 HOOD (TRW) .....$.50

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TERMS: Cash, Check, or Money Order. TX res. add 6% tax. Please add $3.50 for shipping. All orders shipped within 48 hours.

SOFTWARE SHOPPING LIST

NAME: Decisionmate
TYPE: software for local governments
COMPUTER: IBM PC, IBM XT, TI Professional Computer and Sperry PC
DESCRIPTION: Decisionmate includes three systems: fund accounting, utility accounting and payroll/personnel. The systems may be purchased separately and as a unit.
PUBLISHER: Arthur Young, 277 Park Avenue, New York, NY 10172

NAME: ON-COURT
TYPE: game
COMPUTER: Commodore 64
DESCRIPTION: This game captures the play and feel of real tennis with full racquet control over groundstrokes (angle and spin), serves, lobs and smashes. The computer plays as tough as real tennis players. You can choose from grass, hard court or clay.
PUBLISHER: Gamestar, Inc., 1302 State Street, Santa Barbara, CA 93101 (805) 963-3487.

NAME: QUICK-COPYer II
TYPE: Disk backup program
COMPUTER: TI-99/4A
DESCRIPTION: This program backups your disk in 3 passes or less. Initialize the copy disk in any format (including double density). Transfer single sided disk to double sided disk and/or single density to double density, or vice versa. Reorganizes the copy disk for faster access, and less wear and tear on your drive.
PUBLISHER: QUALITY 99 SOFTWARE, 1884 Columbia Rd. #500, Washington, DC 20009.
COST: $39.95

NAME: LOTTO PICKER
TYPE: betting program
COMPUTER: TI-99/4A
DESCRIPTION: Lottery players from California to Canada can now increase their chances of hitting million dollar jackpots. This program generates a series of random plays for all Lotto-type games, duplicating the same process used by Lottery Commissions, in order to eliminate bias from the selections. Written in CONSOLE BASIC.
PUBLISHER: Ridge Services, 170 Broadway, Suite 201, New York, NY 10038 (718)833-6335.
COST: $25

NAME: CURVES
TYPE: scientific
COMPUTER: IBM PC, PCjr and compatibles
DESCRIPTION: This program will plot up to two families of math curves with overlays, autoscaling and unique moveable enlargement window.
PUBLISHER: BRIDGE SOFTWARE, 31 Champa Street, Newton Upper Falls, MA 02164
COST: $35.

NAME: PUZZLEWARE DOS: PC-DOS or MS-DOS
TYPE: Entertainment
COMPUTER: IBM PC, PCjr, and compatibles
DESCRIPTION: PUZZLEWARE is two programs that create and solve hidden word puzzles. The menu-driven programs allow the user to quickly and easily create and solve hidden word puzzles, print puzzle listings, store puzzles and disk and read puzzles from disk. PUZZLEWARE requires an IBM PC, PCjr, or compatible system 128KB memory, monochrome or color monitor, one 320/360KB disk drive, and an 80-column printer.
PUBLISHER: Precision Software Services, 4618 Bexley Way, Stone Mountain, GA 30083.
COST: $12.95 + $2.05 postage and handling. Documentation is included with the software.

NAME: TOOLKIT DOS: 2.0
TYPE: utilities program
COMPUTER: IBM PC
DESCRIPTION: The TOOLKIT is a software package for use with LOTUS 1-2-3. The 30 worksheet files provide both the beginning and advanced user with a wide range of utilities that call on the most sophisticated features of LOTUS 1-2-3.
PUBLISHER: Phase Two Software, 387 Main Street, Armonk, NY 10504.
COST: $34.99

NAME: MANY WAYS TO SAY I LOVE YOU
TYPE: educational
COMPUTER: Apple Macintosh, II +, IIe, Atari, Commodore 64, and IBM PC, PCjr
DESCRIPTION: Intended for ages 4 and up, this program is a computerized design tool that allows children to create their own electronic greeting cards to share with family and friends. Picture-driven activity menus make the program easy and fun to use. Developed by Fred Rogers.
PUBLISHER: CBS Software, A Unit of CBS, Inc., One Fawcett Place, Greenwich, CT 06836 (203)622-2500

NAME: DIAGNOSE 64
TYPE: Diagnostic tool
COMPUTER: Commodore 64
DESCRIPTION: Diagnose 64 plugs into the cartridge expansion slot and locates bad RAMs, ROMs, CIAs, and microprocessors all without desoldering.
PUBLISHER: MicroDoctor, 1655 Central Street, Denver, CO 80211 (303)458-6713

NAME: TRIPLE PLAY GAME DISK ONE
TYPE: Entertainment
COMPUTER: Apple Macintosh
DESCRIPTION: Featured on this disk are Backgammon, Mancala, and Deduce. Each of the games is playable at several levels of difficulty so that all ages can participate.
PUBLISHER: STEL Enterprises, P.O. Box 6354, Lafayette, Indiana 47903, (317)742-5369.
COST: $39.50

NAME: BOOK TRAK ON-LINE CIRCULATION SYSTEM, Version 2 DOS: APDOS
TYPE: Library management
COMPUTER: Apple //e
DESCRIPTION: Floppy-disk based circulation system. Books are checked in and out by reading the borrowers' and the books' barcodes. Prints overdue notices and lists, is used for inventorying the collection, compiles library statistics. Handles collection of 65,000 volumes.
PUBLISHER: Follett Library Book Company, Quality Courseware Division, 4506 Northwest Highway, Crystal Lake, IL 60014 (800)435-6170.

NAME: IRASCOPE DOS: APPLE DOS
TYPE: Tax program
COMPUTER: Apple IIe and II +
DESCRIPTION: This program can do the following: Handle one IRA or several portfolios, calculate cumulative rates of return, display data on demand, does "what-if" analyses, projects retirement income, adds spouse's income, helps estimate future taxes, instantly reviews years of transactions, and more.
PUBLISHER: Dynalogic Inc., P.O. Box 10068, Lynchburg, VA 24506.
COST: $59.95

NAME: TIME PLAN DOS: MS-DOS
TYPE: Management tool
COMPUTER: IBM PC
DESCRIPTION: This program is the entry level tool for project management systems designed for the manager who is responsible for estimating durations and developing schedules. Excellent tool for the non-technical environment where the primary concern is "How long will it take?"
PUBLISHER: Mitchell Management Systems, Inc., Westborough Office Park, 2000 West Park Drive, Westborough, MA 01581.
COST: $129

NAME: RESEARCH DOS: IBM DOS
TYPE: Statistical program
COMPUTER: IBM PC, XT, AT
DESCRIPTION: Helps you manage, graph, and analyze an unlimited amount of daily, weekly, and monthly data. These different types can be plotted together on the same screen. The program generates a calendar of days automatically and data can be transferred into it from other programs such as a 1-2-3 spreadsheet.
PUBLISHER: Economic Software, Inc., P.O. Box 10925, Eugene, OR 97440.
COST: $695

NAME: DISPLAYSAVER
TYPE: Utility
COMPUTER: IBM PC, XT, AT
DESCRIPTION: DISPLAYSAVER provides a time-out feature that will blank out your monitor's display after a preset period of inactivity and will bring back the display with the touch of any key. This results in longer monitor life and keeps others from viewing sensitive data on your display.
PUBLISHER: SOFTECH, 24 East 22nd Street, New York, NY 10010 (212)505-8005.
COST: $39

NAME: CATALOG OF NEW PROGRAMS
TYPE: Educational
COMPUTER: PET or COMMODORE 64
DESCRIPTION: Independent School District 281 in Minneapolis, MN has developed 200 programs produced for the Commodore 64 and PET for purchase and use by other school districts. If you are interested in ordering any programs, a list of all programs is available. Please specify PET or C-64 when ordering.
PUBLISHER: Independent School District 281,

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Donna Jean Carter, Ph.D., Superintendent, 4148 Winnetka Avenue North, Minneapolis, Minnesota 55427, (612)533-2781.

NAME: SOFTERM
TYPE: Communications program
COMPUTER: IBM PC, Apple IIc and Apple II
DESCRIPTION: Already available for the IBM PC and Apple II, this version is newly developed for the Apple IIc. It will enable Apple IIc users to access information services, bulletin boards, electronic mail systems, and even their company's computer.
PUBLISHER: Softronics, Inc., 3639 New Getwell, Suite 10, Memphis, TN 38118 (901)683-6850.
COST: Softerm 1 $135, Softerm 2 $195

NAME: JOB CONTROL
TYPE: Job tracking/job costing package
COMPUTER: MSDOS/CPM-6 computers
DESCRIPTION: It is designed specifically for the job shop who has to bid a job prior to manufacture or fabrication. These shops include machine sheetmetal and the woodworking trades. Using MENUS, the program guides the user through all phases of a job. The package includes everything necessary to process bids, purchase orders, work orders, daily labor and generate reports.
PUBLISHER: TM Computer Systems, Inc., 3076 E. Burnside, Portland, OR 97214 (503)232-1084.

NAME: THE EDUCATION DISK DOS: 3.3
TYPE: Educational
COMPUTER: Apple II+, IIe, IIc
DESCRIPTION: The Education disk consists of five programs useful in teaching students how to read scientific instruments. It also serves as a study aid. Andent's ruler, Graduated cylinder, Beam Balance, and Analog meter are high resolution simulations of the metric scales for these instruments. Andent's Flash*cards is a flashcard simulator.
PUBLISHER: Andent, Inc., 1000 North Avenue, Waukegan, IL 60085 (312)223-5077.
COST: $29.95

NAME: FREE FILER DOS: MSDOS, CP/M
TYPE: Data retrieval program
COMPUTER: CP/M, MSDOS, Kaypro, Morrow and IBM PC
DESCRIPTION: FREE FILER divides your diskettes into parcels of information. It will segment your text files into paragraph parcels automatically. FREE FILER can scan through a 55K file in less than 25 seconds.
PUBLISHER: Telion Software, P.O. Box 1464, La Mirada, CA 90637-1464 (714)994-5135.
COST: $149

NAME: CLIENT BILLING SYSTEM DOS: ProDOS version
TYPE: Accounting
COMPUTER: Apple II
DESCRIPTION: This program allows you to maintain account information, including client addresses, phone numbers, and account balances, produce customized statements formatted for window envelopes, provide valuable reports and analyses of productivity, and print client mailing labels.
PUBLISHER: High Technology Software Products, Inc., P.O. Box 60406 Oklahoma City, OK 73146 (405)524-4359.
COST: $300

NAME: THE STORE MANAGER DOS: ProDOS version
TYPE: Inventory control
COMPUTER: Apple
DESCRIPTION: The Store Manager turns your Apple into a cash register. It produces invoices, purchase orders, receiving reports, expense vouchers, packing slips and quotations and maintains up-to-the-minute sales totals. Valuable reports are generated which provide needed management information, including which items need to be reordered, which inventory items are the fast movers, and which products generate the greatest profits. The ProDOS version is compatible with the Profile hard disk, enabling inventory capacity to increase for 1170 items to over 7000 items.
PUBLISHER: High Technology Software Products, Inc., P.O. Box 60406, Oklahoma City, OK 73146 (405)524-4359.
COST: $295

NAME: NORAD Military Controller
TYPE: Simulation/Game
COMPUTER: TI-99/4A
DESCRIPTION: NORAD is a single player simulation of the duties of the chief-of-staff during an air attack from the USSR. Several squadrons of high-velocity bombers invade and must be intercepted, meanwhile attacking the enemy's targets of importance. A companion game to Not-Polyoptics Civilian Tower, NORAD is a game that requires great strategy in addition to the skills normally associated with air traffic control.
PUBLISHER: Not-Polyoptics, 13721 Lynn Street, Suite 15, Woodbridge, VA 22191
COST: $19.50

NAME: ASTROSTELL
TYPE: Astronomy
COMPUTER: IBM PC, XT, PCjr and Apple II
DESCRIPTION: ASTROSTELL lets you learn the constellations using your computer. All 88 constellations are included plus the many deep sky objects they contain. The constellations are shown on screen using 4 levels of star brightness to approximate what is seen in the sky. The features of the program include calling up constellations by name to screen, random display mode to guess correct names, giving names and magnitudes of bright stars, option to show stars only or with objects, classical lore given for each constellation.
PUBLISHER: Zephyr Services, 306 S. Homewood Ave., Pittsburgh, PA 15208 (412)247-5915.
COST: $29.95

NAME: KEEPING SAFE
TYPE: Instructional
COMPUTER: Apple II, II+, IIe or IIc
DESCRIPTION: KEEPING SAFE is a program that teaches children as young as five how to handle potentially dangerous situations. A wide variety of encounters are projected—ranging from "Strangers in Cars" to dealing with "People You Know"— giving youngsters a chance to experience potential problems in a non-threatening way. Participants in the simulation program learn to make good decisions to help characters "Buddy" and "Sally" keep safe in their daily activities.
PUBLISHER: Marshware, P.O. Box 8082, Shawnee Mission, Kansas 66208 1-800-821-3303.
COST: $49.95

NAME: INVESTOR III DOS: 1.1, 2.0
TYPE: Real Estate investment analysis package
COMPUTER: IBM PC, XT, COMPAQ, TRS-80 Models II, 12, 16, and 2000, TI Professional, Corona, Columbia, and other IBM compatibles
DESCRIPTION: Investor III is a comprehensive program for analyzing real estate investments, including pro forma cash flow, property appreciation, key financial ratios, and before and after tax yields. Investor III provides a comprehensive financial analysis of the purchase, operation, and sale of the potential real estate investment.
PUBLISHER: GOOD Software Corp., 12900 Preston Road, Dallas, TX 75230 (214)239-6085.
COST: $249 + $5 shipping

NAME: AMORTIZER III DOS: DOS
TYPE: A program for preparing loan amortization schedules and summaries
COMPUTER: IBM PC, XT, Compaq, T.I., Corona, Columbia, and other IBM compatibles
DESCRIPTION: AMORTIZER II is an easy-to-use program for handling loan information and loan amounts. It includes flexibility for variable interest rates, multiple loans, balloon payments, and negative amortizations. A variety of payment intervals are available.
PUBLISHER: Good Software Corp., 12900 Preston Road, Dallas, TX 75230 (214)239-6085.
COST: $79 + $5 shipping

NAME: ONE-WRITE PLUS DOS: MSDOS
TYPE: Accounting package
COMPUTER: IBM PC, XT and other IBM compatibles
DESCRIPTION: One-Write Plus generates more than a dozen key management-accounting journals and reports, including financial statements, cash disbursements journal, cash receipts journal, audit trails, cash flow analysis and accrual worksheets.
PUBLISHER: Evergreen Software, The Meeting Place, Amherst, NH 03031 (603)673-0830.
COST: $295

NAME: MACLION
TYPE: Relational database management system
COMPUTER: Macintosh
DESCRIPTION: MacLion is a true relational system. There is no logical limit of the number, range, or variety of data which may appear on the screen. Files are broken down into relations and many relations may be combined together to suit any need however simple or complex. It makes files and relations easy to handle by the addition of two additional unique features—a report writer and a screen generator.
PUBLISHER: Computer Software Design, Inc., 1911 Wright Circle, Anaheim, CA 92806 (714)634-9012.

CLASSIFIED

CLASSIFIED INFORMATION

CLASSIFIED AD RATES

The classifieds are for **Pre-Owned Items & Software ONLY.** New equipment, Services, etc. must use regular Display space.

Instructions

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1. Type or print your ad legibly on a plain sheet of paper. Ads received that are difficult to read will be returned.
2. **Write the desired category at the top of each ad. Please refer to the index, this page. If a category is not indicated, ad will be placed in the Miscellaneous section.**
3. If more than one ad is submitted, use a separate piece of paper for each ad, making sure your complete name and address is at the bottom of each ad.

CLOSING DATE — 2nd Monday of the month. Example: the closing date for June's Issue is the 2nd Monday of April. **Due to our low rates, you cannot change, cancel or receive a refund on classifieds after they are typeset.** In most cases, ads are typeset within a week after they are received.

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8 point line, $1.22 cents per line.
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Maximum of 15 characters per line.

Non-subscriber rates are double all rates listed above.

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Ads running more than one time. A repeat ad will be coded at the end of the ad with the month ad started and issue ad ends. Example: 8-160. Ad started Aug. ends 160 issue or January. NOTE: Please check to make sure your ad has been correctly coded.

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★ ★ **$4.00**

★ ★ ★ **$3.00**

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It's a fact...unusual "artwork" in or above an ad draws attention that ad and the reader retains interest in that product longer.

GET RESPONSE QUICKER with "Stars" above your ad. Below is the rate for different sizes. Just mark "stars" and the price of the one you choose above your ad copy and we'll take care of the rest. Be sure to include the cost with your ad payment.

CS-ABBREVIATIONS

add-post . . . . . add postage
add-post-AP . . . add postage, all prices
FC . . . . . Freight Collect
MBG . . . . . money back guarantee
PP . . . . . postage paid
SASE . . . . . send self-addressed stamped envelope for
. . . . . check return or
. . . . . information requested
10 DRP . . . . . 10 day return privilege
CCR . . . . . check clearance required

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10 Point Centered Head

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Complete **OPERATING SYSTEM** with RT-11 system software plus basic. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

Individual Listings

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11/03 Computer $900
Dual RZ-1 disc $1,000
32KB memory $2,800
Intertube video terminal $400
John Doe, POB 1234, Somewhere, USA 00000. 123-456-7890.

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Classified Dept., COMPUTER SHOPPER
P.O. Box F, Titusville, FL 32781

To figure cost of ad, the rate is 17 cents per word, (34 cents per word bold face) $3.00 per ad minimum charge.

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You may run my ad _____ issues.

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(101) TRS-80 COMPUTERS FOR SALE

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48K MODEL I with LN DOUBLER 5/8, Double Density MultiDos, Editor/Assembler PLUS, MISOSYS DSMBLR III, Disk Drive cable, serial cable, serial board. $400. call after 6 PM, **612-429-8193,** shipping extra. 3-64

COCO 64K extended, new, disk drive, OS9, "C" compiler, BASIC, LOGO. **Joe Ruby 305-972-6641**

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******EDITOR'S SALE******

COMPLETE TRS-80 Model 100 System. Includes 32K portable computer, attache carrying case, printer and modem cables, acoustic cups, manuals, software includes brand new disk/video adapter unit. System cost over $2000, for sale only $950. Everything in excellent condition. Sold only as a system. Call **STAN VEIT,** 305-269-3211

FREE SOFTWARE Co-Co home finance suitable for tape or disk, 16K required. Enclose $2.00 fee for handling, duplication and postage. **Paul Geyer,** Carteret Mobile Park, F-1, Carteret, N.J. 07008 3-64

★ ★

LIQUIDATION! MODEL II $1200, MODEL III 48K RS-232 + Extras $200, **Dave 805-965-0770** wk. 961-6067

LNW MODEL-II Computer Plus Epson FX-80 Printer. 2 - 5¼" drives All interface boards with 128K. Includes CP/M DOS PLUS spreadsheet word processing, accounting software and more. $1450.00, **Ted Kciuk,** 7 Aconbury Dr. Fairport, N.Y. 14450

MOD4 128K Green screen, CP/M 2.2, 3.0, lots of software, perfect condition, orchestra 90 board. **Joe Ruby 305-972-6641.**

MODEL 100: 24K, Modem cable, briefcase, software $550, **615-875-0802**

MODEL 100 32K WP/SS software. Cassette unit, modem and printer I/F. **Almost new** (original pkg.) **$900** plus shipping. **Bruce Wilson,** 27 Whispering Pines, Birdsboro, PA 19508. 1-62

MODEL-100 32K with modem cord. Perfect condition. $600. **Duane 714-796-1518,** 24715 Lawton Ave., Loma Linda, CA 92354

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MODEL 1 for sale, with capacitance keyboard, 48K, speed up. Lower case, percom doubler, 2 percom TFD-100 drives, NewDos 80, Dos Plus, lots of software and magazines. $600. ALL, B/O pieces. Also, old-style Model F, with serious keyboard electronics problem, $50. **Dan Mendrala,** 4 Paul Street, South Hadley, MA 01075. (413) 536-7253

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Hayes 1200 Modem	$450
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Anchor Signalman 1200 Baud Modem	$235
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Warehouse Data Products acquired a bankrupt wholesalers programs. We are offering the few remaining at giveaway prices!!! Sale prices limited to stock on hand. All sales final.

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CBASIC 86	300.00	75.00
CP/M-80 8"		
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SUPER SPELLGUARD	195.00	35.00
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WORDSTAR V 3.3	495.00	125.00
WORDSTAR SPELLSTAR V 3.3	695.00	150.00
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MODEL II Expansion Unit with 1 drive $500. Line Printer VI $450; **Betty 216-729-2808 after 2PM**

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MODEL I Level II cassette based system. Printer/Expansion Interface. Selection of books and cassettes: Games/Math, Aids/Utilities. SASE for List/Comment. Asking $600/Package. **Ed Lima,** 131 Weatherstone Drive, Forest City, NC 28043, 1-704-245-5125

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AP = Apple II+ or IIe, AT = Atari M = MacIntosh. Add $2.00 per item for shipping. Use VISA/MC for fastest shipment.

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ADVENTURE First best book of Adventure for TRS-80. Easily translated to your computer. 18 BASIC Language Adventures and disk based generator in Model I/III/IV Microsoft. Plus complete how-to tutorial. Retailed at $19.95. Your price $12.95 postpaid anywhere. Send check, MO, MC or COD order to: **Captain Eighty,** PO Box 66, Peterborough, NH 03458 or (603)924-6065 3-65

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CLOCK PROGRAM Make your model 1 or III an accurate clock and calendar. Easily seen at 50 feet. Send formatted disk and $5 or $8 and no disk. **Frank Kauffman,** Box 7, Grand Island, FL 32735. 904-589-2713.1-62

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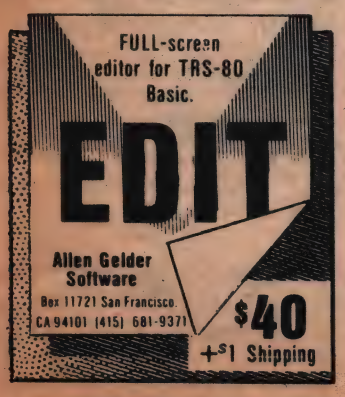

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Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

FEBRUARY 1985

FEBRUARY 15-17, 1985
RAINBOWfest will be held in Irvine Marriott in Irvine, CA.
FEBRUARY 16, 1985
COMPUTER SHOW AND FLEA MARKET, sponsored by the Board of Directors of the New York Amateur Clubs, will be held at the Community Hall in the Church of Saint Anthony located at the corner of Sullivan and Houston Streets, NYC, NY. Hours will be from 10am-6pm. Admission is $2.50. For more information, call Don Johnson at 212-732-2565.
FEBRUARY 20-22, 1985
INFO/CENTRAL: The Information Management Exposition & Conference will take place at the O'Hare Exposition Center in Chicago, IL. For more information, contact INFO/CENTRAL 999 Summer St., Stamford, CT 06905 (203)964-8287
FEBRUARY 21-23, 1985
MACWORLD EXPO will be held in Brooks Hall in San Francisco, CA. Call 617-329-7466 for more information.
FEBRUARY 22-23, 1985
IEEE Computer Faire will be hosted by the Institute of Electrical and Electronic Engineers. The event will take place in the Exhibition Hall of the Von Braun Civic Center in Huntsville, AL. The hours are 10am-7pm on Friday and 9am-5pm on Saturday. For more information, contact Terry Mizell at 205-532-2036
FEBRUARY 25-27, 1985
STRICTLY BUSINESS COMPUTER EXPO will be held in the Hyatt Regency in Minneapolis, MN.

MARCH 1985

MARCH 2-3, 1985
COMPUTER SUPERMARKET will be held at the San Mateo County Fairgrounds in San Mateo, CA. Contact Microshows, P.O. Box 4323, Foster City, CA 94404 (415) 571-8041 for more information.
MARCH 3, 1985
COMPUTER CENTRAL, a multi-vendor show (and flea market) will be held in the Rand Park Field House, located at 2025 Dempster Street, Des Plaines, IL. Hours are 9:30am-4:00pm. Admission $4 for adults—$2 for Children 8-15. Under 8 free. For more information, call 312-940-7547.
MARCH 3-8, 1985
The Annual Convention and Technology Exposition will be held at the Albert Thomas Convention Center in Houston, Texas. Hosted by The American Institute for Design and Drafting, the convention marks its 25th and the technology exposition its 10th. The theme will be "Soaring To New Heights." For more information, write to AIDD National Headquarters, 901 N. Washington Street, Suite 509, Alexandria, VA 22314
MARCH 4-7, 1985
THE 13TH ANNUAL INTERFACE '85, sponsored by McGraw-Hill's *Business Week* and *Data Communications*, will be held at the Georgia World Congress Center in Atlanta. The show, for large scale corporate, government and institutional users will feature large scale corporate, government and institutional users, will feature systems and services focused on data communications and office systems integration. For more information, write to The Interface Group, Inc., 300 First Avenue, Needham, MA 02194.
MARCH 5-7, 1985
FEDERAL OFFICE SYSTEM EXPO will be held in the Washington Convention Center, Washington, D.C. For more information, contact National Trade Productions 703-683-8500.
MARCH 5-7, 1985
MINI/MICRO SOUTHEAST '85 will be held in the Georgia World Congress Center, Atlanta, GA. For more information, contact IEEE & The Electronic Representative Assoc. 213-772-2965.
MARCH 5-7, 1985
SOUTHCON/85 to be held in the Georgia World Congress Center, Atlanta, GA. For more information, contact IEEE & The Electronic Representative Assoc. 213-772-2965.
MARCH 5-7, 1985
DALLAS/FT. WORTH BUSINESS EXPO to be held in the Dallas Market Hall. Call Business Expositions 313-569-8280 for more information.
MARCH 7-10, 1985
NY COMPUTER SHOWCASE & EXPO to be held in the NY Coliseum. Call 617-449-6600 for more information. This is an Interface Group production.
MARCH 7-10, 1985
COMPUTER SHOWCASE EXPO will be held in the Civic Plaza in Phoenix, AZ. For more information, write to The Interface Group, Inc., 300 First Avenue, Needham, MA 02194.
MARCH 9-10, 1985
WASHINGTON DC—BALTIMORE MICROCOMPUTER PLACE SHOW AND COMPUTER FLEA MARKET will be held in Sheraton Northeast Exhibition Center by Kengore Productions.
MARCH 11-14, 1985
The Computer Science Conference will be held in the Marriott Hotel in New Orleans, LA. The conference is sponsored by the Association for Computing Machinery and the Computer Science Departments of many universities. For more information, write to Computer Science Employment Register, Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, PA 15234.
MARCH 13-14, 1985
THE UNIVERSITY OF WASHINGTON COMPUTING CENTER'S 11TH ANNUAL COMPUTER FAIR will be held in Seattle at the University of Washington campus. The Fair will present over 100 vendor displays ranging from personal computers to highly sophisticated CAD/CAM, image processing, and networking systems. For more information, contact Dr. Thomas H. Bennett at 206-543-5728 or write U.W. Academic Computing Center, 3737 Brooklyn Avenue Northeast, Seattle, WA 98105
MARCH 13-14, 1985
COMPUTER SHOW to be held in Ohio Center, Columbus, OH. Call Bob Chase (Class Productions) at 219-483-6144 for more information.
MARCH 14-16, 1985
PERSONAL COMPUTER INTERFACING WORKSHOP will be held in Blacksburg, VA at Virginia Tech. This is a hands-on workshop with each participant wiring and testing interfaces. For more information, call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061 (703)961-4848.
MARCH 15-17, 1985
1ST ANNUAL PHILADELPHIA COMPUTER SHOW to be held in the Philadelphia Civic Center. For more information, call CompuShows 301-263-8044.
MARCH 15-17, 1985
ORLANDO HAMCATION to be held at the Orlando Expo Center. For more information, contact 305-295-2929.
MARCH 18-21, 1985
INDIANAPOLIS COMPUTER EXPO will be held in the Indiana Convention Expo Center in Indianapolis, IN. For more information, call Class Productions at 219-483-6144.
MARCH 19-20, 1985
CHARLOTTE HAMFEST AND COMPUTER FAIR will be held in the Charlotte Civic Center. Call Mecklenberg Amateur Radio Society 803-366-7157 for more information.
MARCH 21-23, 1985
THE 2ND ANNUAL COMDEX/WINTER SHOW will be held in the Anaheim Convention Center in Anaheim, CA. Total show attendance is expected to reach 25,000, most of whom will be computer retailers, distributors, system integrators, value adders, commercial, etc. For more information, write to The Interface Group, Inc., 300 First Avenue, Needham, MA 02194
MARCH 22-24, 1985
THIRD ANNUAL MARYLAND COMPUTER SHOW will be held in the Baltimore Civic Center. For more information, call CompuShows 1-800-368-2066.
MARCH 29-31, 1985
NEW YORK CITY PERSONAL COMPUTER SHOW will be held in the Madison Square Garden—Exposition Rotunda. This is a Ken Gordon Production 201-297-2526.
MARCH 30, 1985
HOBBIE HI TECH 85, a ham radio/computer show and swap meet, will be held in Fargo, North Dakota in the Army National Guard Armory at Hector Field. This event is sponsored by the Red River Valley and N.D.S.U. Amateur Radio Clubs. For more information, contact Tim Gooding WD0GUR, 1006 Sheyenne St., West Fargo, ND (701)282-6630.
MARCH 30-APRIL 2, 1985
THE 10TH WEST COAST COMPUTER FAIRE will be held at the Moscone Center in San Francisco, CA. 350 companies will be exhibiting in 1,000 booths. Price of admission includes comprehensive Conference Programs. For more information, contact Computer Faire, Inc., 181 Wells Avenue, Newton, MA 02159 (617)965-8350.
MARCH 31, 1985
THE 1985 GREATER BALTIMORE HAMBOREE AND COMPUTERFEST will be held at the Maryland State Fairgrounds Exhibition Complex at Timonium, Maryland. This is the largest multi-interest personal computer, small business computer, electronics show, and flea market in the Mid-Atlantic area. A large exhibit area will display and sell the latest computers and software as well as the latest in electronics. Guest speakers will present a wide range of interesting topics throughout the day. Admission is $4, children under 12 are free. For additional information, contact G B H & C, P.O. BOX 95, Timonium, Maryland 21093-0095 (301)561-1282.
MARCH 31-APRIL 3, 1985
SOFTCON will be held in the Georgia World Congress Center in Atlanta. Over 850 exhibitors are expected. For more information, call or write Softcon, c/o Northeast Expositions, 822 Boylston Street, Chestnut Hill, MA 02167 (617)739-2000.

APRIL 1985

APRIL 2-4, 1985
GULF COMPUTER AND OFFICE SHOW will be held at the Rivergate Center in New Orleans, LA. For more information, call 504-467-9949.
APRIL 6-7, 1985
FORT WORTH COMPUTER FAIR will be held at the Amon G. Carter Exhibit Hall (Will Rogers Complex) in Fort Worth, TX. Admission is $3 (Accompanied kids under 12 FREE). Hours are 10am-5pm. For more information, call (817)732-1194.
APRIL 10-13, 1985
MIL '85 INTERNATIONAL EXHIBITION OF BUSINESS SOFTWARE will take place in Cannes, in Southern France. This exhibition will be the first major international software show in Europe. For more information, write Commissariat General, 179, Avenue Victor Hugo 75116 Paris, France.
APRIL 14-18, 1985
NATIONAL COMPUTER GRAPHICS ASSOCIATION will be held in the Dallas Convention Center, Dallas, TX. Call the National Computer Graphics Association 703-698-9600 for more information.
APRIL 18-19, 1985
NETWORK MANAGEMENT/TECHNICAL CONTROL will be held in the Marriott Copley Place, Boston, MA. For more information, call Judie McDaid, National Sales Director, 305-737-9059.
APRIL 25-28, 1985
4TH ANNUAL NEW YORK COMPUTER SHOW will be held in Nassau Coliseum in NYC, NY.
APRIL 25-28, 1985
4TH ANNUAL VIRGINIA COMPUTER SHOW to be held in the Pavilion Convention Center, Virginia Beach, VA. Call CompuShows 1-800-368-2066.
APRIL 26-28, 1985
PRODUX 2000 WHOLESALE EXPO '85 will be held in the Philadelphia Civic Center. For more information, call 1-800-523-3882. In PA, call 215-457-2301.
APRIL 27-MAY 1, 1985
SPRING '85 CONFERENCE will be held in Louisville, KY. For more information, contact COMMON, Spring '85 Conference, 435 North Michigan Avenue, Suite 1717, Chicago, IL 60611 (312)644-0828.

MAY 1985

MAY 18, 1985
THE 8TH ANNUAL SHOW & TELL MICROCOMPUTER CONFERENCE will be held at the University of Oklahoma in Norman, OK. The conference brings together microcomputer buffs of all ages and degrees of expertise. For more information and application forms, send a self-addressed, stamped envelope to Show & Tell Computer Conference, Richard V. Andree, O.U. Math Dept., 601 Elm, Norman, OK 73019.

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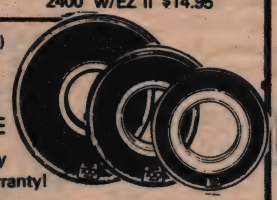

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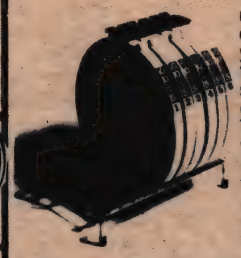

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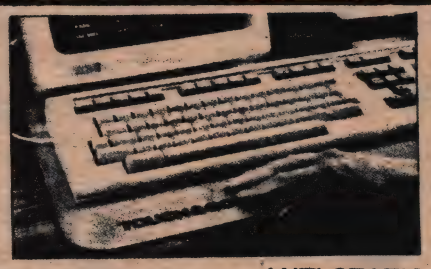

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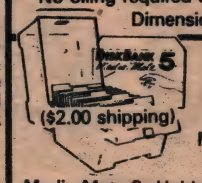

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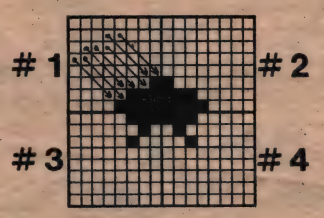

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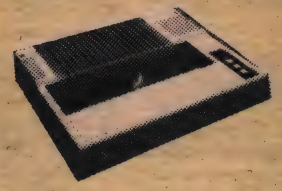

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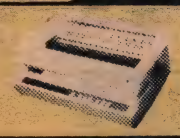

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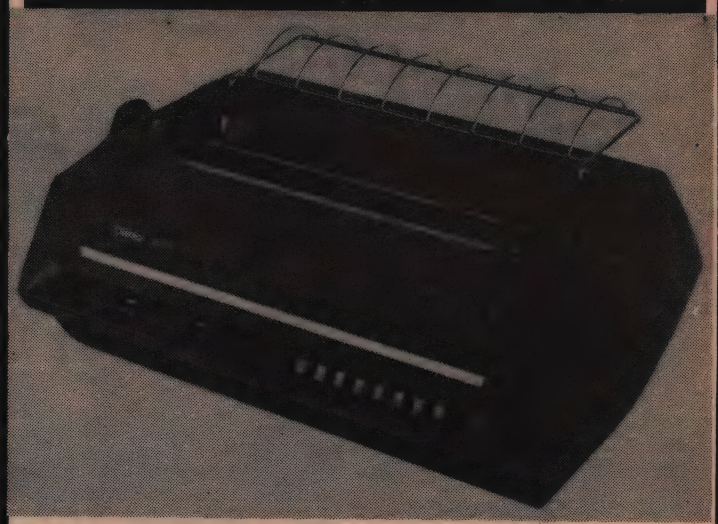

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(125A) SINCLAIR COMPUTERS WANTED

WANTED Third Party Keyboard for Timex Sinclair 1000 Computer. **James F. Stephens,** 1935 W. Stone St., Apt. 204, Fayetteville, Arkansas 72701 3-63

WANTED Timex/Sinclair 1510 "T" Dock cartridge player and cartridges. Also wanted, Silver T/S 2040 printer (must be silver). **Stan Light,** 810 Mammot Road, Alden, NY 14004. 3-63

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(126) MISCELLANEOUS MICROCOMPUTERS

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(127B) XEROX SOFTWARE, PERIPHERAL

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WANTED: SOFTWARE formatted for **EAGLE PC-2** (expanded keyboard). Also technical and service manuals, peripherals. **Si Chervin,** Apt. 404, 105 Lake Emerald Drive, Oakland Park, Florida 33309. 2-63

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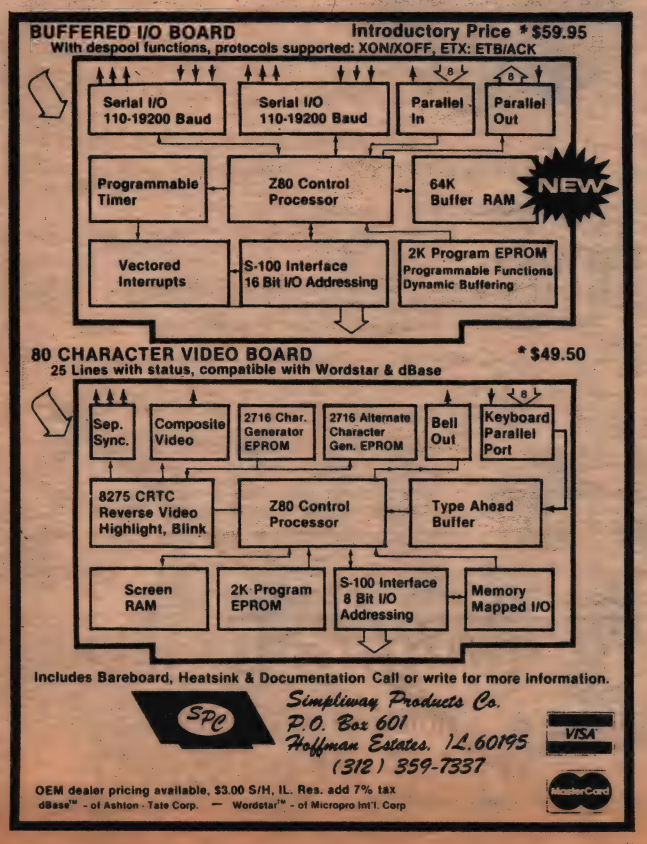
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UCI MEMORY UPGRADE CARD. 256K dynamic RAM installed. Empty sockets for an additional 256K dynamic RAM. We recommend this one highly. Retail $795. Payload **$620**
We will install RAM for a total of 512K. Just add $199 to above price.

UCI Z-100 SPEED MODULE. Run your Z-100 computer at 8.0 MHz instead of 5.0 MHz. Installs easily with no soldering. externally switchable between speed mode and normal mode. This is the best speed module on the market for the Z-100. Five replacement chips are included to insure correct function. Payload priced **$48**
Z-216 8087 Numeric Co-Processor Speeds and improves numeric processing. Retail $379. Payload price **$325**

Winchester Hard Disk Drive External Set-up for Z-100. Includes 26.66 MB (20.97 MB formatted) Fujitsu drive. Zenith S-100 bus interface card, power supply and case with fan, cables, Zenith data separator. Use your Zenith Winchester software. Plug it in, nothing else to buy **$1940**
Winchester Hard Disk Drives. We can supply internal and external set-ups for both the Z-100 and Z-150 computer series. Please ..... **Write or Call**
Second Internal Disk Drive. We can supply a matching drive to update your single drive Zenith computer to a two drive unit. Please let us know what you have and we will quote the Payload Price.

UPGRADE ACCESSORIES
FOR H/Z-89 COMPUTERS

Magnolia Microsystems Double Density Controller. Soft-sectored disk controller. Supports up to four each 5.25" and 8" disk drives. Complete with cables, installation instructions and CP/M 2.242. Payload price .. **$354**
Magnolia Microsystems 128K RAM Board. Add to your 48K H/Z-89 CPU memory for a total of 176K. For a limited time receive CP/M Plus (CP/M 3), a $350 value. at no additional charge. Payload price **$446**
Magnolia Microsystems Memory Upgrade Card. Installs in your H-89 to increase memory from 48K to 64K. Payload price **$68.50**
Magnolia Microsystems SASI Bus I/O. Use to connect Winchester disk drives to you H-89. Also has three Serial Ports. Payload **$225**
Winchester Hard Disk Drive Set-up. Includes 26.66 MB (20.97 MB formatted) Fujitsu drive. SASI Interface (above), power supply and case with fan, cables, controller and CP/M software. Plug it in, nothing else to buy **$1865**

EIGHT INCH DISK DRIVE SYSTEM

Tow Tandon 8" TM848-2 Thinline, Double Density, Double Sided Drives in Deluxe Cabinet with Heavy Duty Power Supply and Cooling Fan. 2.4 MEG Storage Total. Complete with cable. Ready for H/Z-89 with Magnolia DD Controller or any H/Z-100 computer. Payload **$1027**

INTERNAL DUAL DRIVE SETUPS
FOR THE H/Z-89 COMPUTER

Includes two half height double sided disk drives and all hardware and connectors required to mount inside your H-89. Also included is a steel mounting shield/case.

NATIONAL JA551-2 Setup, 48 TPI, 6MS seek, 640K total **$392**
MITSUBISHI 4851 Setup, 48 TPI, 6 MS seek, 640K total **$418**
MITSUBISHI 4853 Setup, 96 TPI, 3 MS seek, 1280K total **$479**

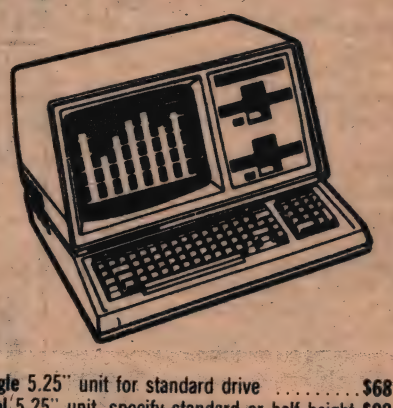
HALF HEIGHT DISK DRIVES

Notice to clubs and quantity users. We can supply the following in case lots of 10 or 12 at reduced prices.

TANDON TM848-2 8" DS, DD, 48 TPI **$396**
NATIONAL JA551-2 5.25" DS, DD, 48 TPI ... **$174**
MITSUBISHI M4851 5.25" DS, DD, 48 TPI ... **$192**
MITSUBISHI M4853 5.25" DS, DD, 96 TPI ... **$218**

POWER SUPPLIES AND CASES
FOR DISK DRIVES

For standard and half height disk drives. Rugged steel construction with heavy duty power supplies. Purchase with drives and we will configure and install drives in case for you.



Single 5.25" unit for standard drive **$68**
Dual 5.25" unit, specify standard or half height **$92**
Dual 8" unit with fan, for thinline drives **$225**
Face plate for single drive in dual case **$8**
For Winchester Drive, 5.25" **$225**

MEMOREX DISKS

These are the disks we use at PAYLOAD, top of the line and reasonably priced. Prices are NET postpaid. No other charges for disk only orders.

#3481 5¼" SS/DD Soft Sector. Box of 10 .. **$24.70**
#3483 5¼" SS/DD 10 Hard Sector, box of 10 **$24.70**
#3491 5¼" DS/DD Soft Sector, box of 10 .. **$32.10**
#3493 5¼" DS/DD 10 Hard Sector, box of 10 **$32.10**
#3501 5¼" DS/DD Soft Sector 96 TPI, box of 10 **$41.10**
#3062 8" SS/SD Soft Sector, box of 10 ... **$27.90**
#3102 8" DS/DD Soft Sector, box of 10 ... **$38.40**

C.ITOH DOT MATRIX PRINTERS

PROWRITER 8510-AP. 10" carriage, 120 CPS, correspondence quality matrix. Tractor and Friction feed. Parallel interface **$366**
PROWRITER 8510-BC2. Same as above but Serial Interface **$467**
PROWRITER/2 Model 1550P. Same as 8510-AP but 15" carriage **$569**
PROWRITER/2 Model 1550 BCD. Same as above but Serial interface **$642**
C.ITOH HOT DOT 8510-SP 10" carriage, 180 CPS, tractor and friction, parallel **$472**
C.ITOH HOT DOT 8510-SR 10" carriage, 180 CPS, tractor and friction, serial **$541**
C.ITOH HOT DOT 1550-SP 15" carriage, 180 CPS, tractor and friction, parallel **$648**
C.ITOH HOT DOT 1550-SR 15" carriage, 180 CPS, tractor and friction, serial **$690**

C.ITOH LETTER QUALITY PRINTERS

STARWRITER F10-40 Daisy Wheel, 40 CPS. Fifteen inch carriage. Order parallel or serial interface. Retail price $1795, Payload price only **$1055**
OPTIONAL BI-DIRECTIONAL TRACTOR FEED for F-10 printers. Retail $325. Payload price **$184**
SINGLE SHEET FEEDER for Starwriter F10 printer. Retail $595. Payload **$387**

PAYLOAD COMPUTER SERVICES

Your satisfaction is guaranteed. All hardware carries a 90 day warranty. Prices listed have been discounted for payment with order. VISA and MASTERCARD orders please add 3%. Add $5.00 to all prepaid orders for handling and shipping, we pay the balance. Actual shipping costs billed for net billing orders to approved accounts. Call us, we will be happy to answer your questions. THANK YOU.

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drives, 40" lowboy cabinet, BDV-11. $5,000 or consider IBM PC-XT system in trade. **G. Gaugler,** 5706 Seascape Ct., Citrus Heights, CA 95610 (916)966-8076 3-63

DEC PRO 350

Complete System - keyboard, monitor, 2 floppy drives, $1900. Hard disk available $1400. **202-337-1303**

DEC PRO 350

PRO 350 with dual floppy, monitor, keyboard, some software, 30 Day Guarantee $1750, **202-337-1303**

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4164-15 HIT/MIT/NEC/TI	$3.75
4164-20 HIT/MIT	$3.75
8265 Pin 1 ref. FUJ	$3.25

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2732-450 HIT/MIT	$4.00
2732A-350 TI	$3.85
2764-250 MIT/HIT	$5.99
27256-	Call

74

74LS74 TI (10K)	Call
74LS86	$.59
74LS125	$.93
74LS153	$.59
74LS161	$.59
74LS244	$.90
74LS367 TI (10K)	$.75
74LS373	$.93
74LS670 TI	$1.95
7438 TI (10K)	$.93
74HCT Series ELCAP	Avail

STATIC RAMS

2016P-1 TOS	$4.20
6116P-3 HIT	$4.55
6116LP-3	$4.95
6264LP-15 HIT	Call

8000's

UPD765AC NEC	Call
8039P-11 MIT	$4.25
8155P	$6.50
8224	Call
8251A	$6.50
8253P-5 MIT	$4.80
8257P-5 MIT	$4.00
8257C-2	$3.75
8259AC NEC	$4.05
8259C-5 NEC	$2.99
8748 NEC	Call
8749 NEC	Call

Prices for 100 pcs. & up
8085AC & subject to change NEC

DEC RAINBOWS $1350

Used, with 256K, keryboard, monitor, CPM, card MSDOS and user kit - $1350. Unused, with 64K, keyboard, monitor, CPM, and MSDOS - $1350. **202-337-1303.**

DEC RAINBOW 100

Used with 64K, keyboard, monitor, operating systems, 30 day guarantee, $1350. with 256K, $1550. **202-337-1303**

PDP 11/03 Computer complete operating system with RT-11 software plus Basic. Brand new Sept. 1976. Sell complete at $8500 plus shipping or separate at: Dual RX01 disk $1000. 32KB memory $2000. Tektronix 4012 terminal $3500. Tektronix 4631 hard copy $3500. **Paul,** 215-692-9877. 2-63

PDP 11/23 Computer. 256K Ram, MMU, floating point option, 4 serial ports, in BALL-W table-top box. Dual 8" DSDD disk subsystem and controller. RT-11 operating system with Basic, Fortran, etc. Including manuals. Like new condition. $4000. **WAYNE,** 215-964-9376 days, 215-641-1942 evening. 3-63

Complete Commodore Repairs

Commodore "64"	$45
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★8032 4032	$65
★1702 Monitor	$50
VIC 20	$35
8050 Disk Dr.	$65
4040 Disk Dr.	$65
8023 4023, MPS 801, 1526	$60

* Excluding Picture Tube

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DEC PRO 350

Several systems (still under warranty) for sale. Best offer. Each includes 512KB RAM, floating point adapter, Monitor, Dual Floppys, 10 meg Hard Disk, LA100 PC Printer (240 CPS, 132 char. carriage) and PRO Operating System V2.0. **BACDATA Medical Information Systems, Inc.,** 100 Campus Road, Totowa, New Jersey 07512. 201-890-1155.

VAX Cabinets full ht. (Cost $2400 from DEC) $995
VAX LPXY-12 Printer $7900
RM05 Drive Unit (No Controller) $7500
Computer Parts Mart, 415-493-5930

(149) DEC SYSTEMS WANTED

PDP8 EQUIPMENT wanted. Help, home computer hobbyist needs assistance in locating reasonably priced used PDP8 hardware, software, and documentation. Interested in PDP8/E or PDP8/A cpu's, power supplies, interfaces, peripherals, memory, cables and documentation. Need an operating system on RX01 8" floppy. (Or any medium). **Jim,** 469 Jayson Ave., Pittsburgh, PA 15228. 1-62

(150) DEC SOFTWARE, PERIPHERAL

$ 50% OFF $

DBase II	list $495 sale $245
Select 86	list $395 sale $170
Multiplan	list $275 sale 130
MBasic	list $250 sale $125
Polycom	list $200 sale $100
List Manager	list $250 sale $125
Money Decision II	$229 sale $115
Condor I	list $295 sale $145
C Compiler	list $500 sale $250
CPM	sale $60
MSDOS	sale $60

Most Unused in original boxes. **202-337-1303**

DEC DYSAN DISKETTES

PREFORMATTED FOR RAINBOW 100 In Boxes with Dysan Labels, $25/10, $210/100. **202-337-1303.**

DEC PERIPHERALS $ CLEARANCE $

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LA50 Printers	$325
LA100 Printers	$825
LQPOZ Letter Quality Printer	$1375
Color Monitors	$625
100A MuRes boards	$299
10 Meg hard disk	$1200
Graphics option	$399
Power Supply upgrades	$150
RX-50 dual disk drives	$99
100A to 100B memory converters	$97

All available now, Call **202-337-1303**

DEC RAINBOW DRIVES 75% OFF LIST

Dual disk drive units, unused for DEC Rainbow 100, 100 +, and 100B $250, **202-337-1303**

DEC RAINBOW SOFTWARE 50% OFF

Multiplan M-Basic, List Manager, Comshare Target Financial modeling, Money Decision II, DBase II, Select Word Processor, CPM Communications. Most Unused. **202-337-1303**

DYSAN DISKETTES DEC FORMATTED

Preformatted RX50 Dysan diskettes, unused in original boxes $250/100. **202-337-1303**

RAINBOW PERIPHERALS

10 meg Hard disk, $1400, Memory Conversion (100A-100B) kits, $85, Power Upgrade, $300. Color monitors, $600. LA50, $375. LA100, $900. LQP02, $1500. Dual disk drives (unused), $300. All with at least 30 day warantee. **(202)337-1303**

(154) IBM SYSTEMS FOR SALE

2 IBM Datamaster computers upgraded for word processing II with Matrix printers - $5,000 each, 1 IBM letter quality printer - $5,000 **Patty Bennett, c/o Donald L. Perlroth & Co.,** 2405 Whitney Avenue, Hamden, Connecticut 06518 3-65

IBM 5120, 32K, Basic, 2 Diskette and 5103 Printer (120 cps). Asking $3500.00. Contact **Piedmont Engineering & Construction Corporation** - 404-634-6692 - Woody Brown.

IBM PC 128K Serial Parallel gameports IBM monitor keytronics keyboard software $2000, **Merrill Chapman,** 2084 Bx Pk East, Bx, NY 10462

IBM SYSTEM 3, 5410 CPU, 5424 multifunction card reader, 5444 disc storage drive, 5445 main drive. 5203 printer, 5496 keyboard, 1731 carbon deleaver, 330 Moore Speeditacher, Model 1 digital ISC terminal adapter, JMB storage disks, operating disks, instructions, etc. You move. $3000 OBO any part. No collect calls. **M. Borofsky,** 50 Pleasant, Claremont, NH 03743. 603-543-0082. 1-62

(155) IBM SYSTEMS WANTED

IBM 5100 models B1-C4 with 5106, 5103. Working condition. **415-355-2075.** 4-62

(156) IBM SOFTWARE, PERIPHERAL

GENERATIONS, the **GENEALOGY** Program for IBM PC. Organized by and for Genealogists worldwide. Ancestrial tracing; statistical data bank. Video and printer outputs. Nationally advertised for $39.95 -- CLIP OUT THIS AD; enclose $29.95 to **MICRO-80 INC.,** 2665-CS Busby Road, Oak Harbor, WA 98277.10-62

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IBM HANDICAPPER - Thoroughbred, Harness, Greyhound Handicappers for IBM, Sanyo 550 and Compatibles. Only $49.95 each, 2 for $74.95; all three, $99.95. See our ad this issue of contact **Federal Hill Software,** 825 William St., Baltimore, Md. 21230, 301-685-6254.

OTHELLO PROGRAM $7. Fun for all and easy to use. Add $1 s/h. Requires color/graphics adapter. CA residents add tax. **James Oh & Associates,** P.O. Box 51007, Pacific Grove, CA 93950. 1-62

POWER SUPPLY 130W, $205. **PCSERV,** Box 524, CML, CA 95009. 408-559-1568. Visa or M/C. 11-62

PUBLIC DOMAIN IBM PC $7 side/vol Librarys: PCBLUE, CP/M86, Formats: PC, IBM86, Columbia 86. SASE, VISA/MC. **Cramer,** Box 28606CS, Cols., OH 43228-06063-63

SALE: Keytronic 5151 keyboard for IBM PC. IBM selectric layout, separate cursor control, and numerical keypad. List $255, Ask $180. 10 MB Harddisk and 5MB removable harddisk with harddisk controller that can control two 5.25" and two 8" drives. **Roy Lee** 714-833-6287 (W), 714-786-4183 (H)

(160) NCR SYSTEMS

CLASSIFIED DEADLINE:
2nd Monday of the month

(162) NCR, SOFTWARE, PERIPHERAL

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(166) MISC. (HARDWARE & SOFTWARE)

20 USER

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MODCOMP-II SPARES

ALL EQUIPMENT worked at one time, but is sold in "as is" condition. CPU Plane 2 $1750.00, T.T.Y. Controller $995.00, 16K Core Memory $1500.00, 32K Core Memory $1750.00, Send Cashiers' Check or Money Order To: **MKS,** Box 459, Cocoa, FL 32922 3-63

CROMEMCO Z80-68000 **DPU,** System Zero-D S-100 Cabinet. 256Kb RAM, **TU-ART** serial-parallel I/O card, **64FDC** Disc Controller with two 5¼ DS/DD drives and one new/unused 8 inch DD Drive and Cabinet. **QUME** VT-102 (green) CRT. New **Okidata** 82A printer with high speed serial buffer. Software includes CP/M, CDOS and Cromix (68K) operating systems, Wordstar 3.3 and Spelstar, Z80 and 68K enhanced basics, many disc's utility and user software - compilers, etc. System purchased new 9/83 for $8000 plus - including software - has approximately 200 hours use. Will sell for $4600. All in **Mint** Condition and includes manuals. **Bill Pinkerton,** 305-676-1882 only 6-9PM EST., 1148 Newbern, Palm Bay, FL 32905

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INTEL PERSONAL DEVELOPMENT SYSTEM. New portable IPDS-100 with dual processor, SBX expansion, prom programmer/EMV adapter, 5¼" floppy and case. Excellent tool for any 8 bit or single chip micro controllers (8088/8085/8051/8048). Uses Isis or CPM. Original cost $7500. Will sacrifice for $3900. **Matt Katzer,** 415-961-4684. 2-62

LOCKHEED SYSTEM III. Complete w/300LPM printer, Dual 10mb hard drives, Desk, Display, Keyboard, In-

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PROTO CARDS For IBM-PC, Apple-II, S-100, and SS-50 Systems. Other SS-50 Cards. More information write: **QUALITY RESEARCH COMPANY,** PO Box 7207, Spokane, WA 99207-0207 3-64

PUBLIC DOMAIN 5" $5SS/ $6DS/ $8flpy. Librarys: CPMUG, SIGM, Piconet, IBMPC, Osborne, Zorba, CPM86. Sect-191 SoftFRMTS. SASE. VISA/MC. **Cramer,** Box 28606CS, Columbus, OH 43228-0606. 2-62

PUBLIC DOMAIN 5" $5SS/ $6DS/ $8flpy. Librarys: CPMUG, SIGM, Piconet, IBMPC, Osborne, Zorba, CPM86. Sect-191 SoftFRMTS. SASE. VISA/MC. **Cramer,** Box 28606CS, Columbus, OH 43228-0606. 2-63

UNIX SYSTEMS
$2750
Altos 8600-12 Multi user XENIX system with 512K, 20 meg hard disk, 16 bit processor, Demos, in original boxes with 30 day guarantee. Now in stock, many available. $2750, 3250 with Xenix runtime and development. 202-337-1303.

VARIAN DATAMACHINES V72 16 Bit Mini Computer w/32K word core memory for sale. Also spare 16K core memory board. DEC writer LA36 terminal, four Diablo 31 disk drives, w/power supplies, systems industries disk controller Model 3010, Wang Co tape unit model 10 - 37½ IPS 800 B.P.I. with varian tape controller, 1 ea. Tektronix 4010 and 4014 storage tube display Terminals. Auto-Trol model 6031 flatbed pen plotters (2), Auto-Trol 4000 series digitizer. Call **918-335-2480 C.S.T.** 3-63

WANG LAB 2200SVP-8C IBM Floppy, 4MB Hard Disk, 2236DE Terminal, Cables, Manuals and Operating System $3800.00, **616-334-3849** (Michigan) 3-64

(170) CARD READERS

(172) DISK DRIVES

8" ½ HEIGHT DSDD Shugart MOD SA 810 Mint condition with 6 month warranty. These drives do not require AC, track to track access time IS 3MS, Capacity is 800KB $279.00 C.E.C., (415)342-4058, P.O. Box 1965, Burlingame, Calif. 94010 3-63

8" SSSD Drives. $75. Can be used as Double Density. Removed from operational equipment. **DIGITAL SEARCH** 803-877-9444

8" SSSD Drives. $75. Can be used as Double Density. Removed from operational equipment. **DIGITAL SEARCH** 803-877-9444

$$$$$$ AND—OR BYLINES for Repair Information/Articles about Disk Drives, Printers, Plotters - all manufacturers, types. Also, Service Manuals wanted. **CONSUMERTRONICS,** 2011 Crescent, Alamogordo, NM 88310. 2-66

CABINET FOR TWO 8 inch disk drives. Will accept the wide Shugart type drives (SA800-2 or SA850) includes two fans, all AC and DC wiring. $60.00, Power Supply for Cabinet, $60.00, **Cascade Electronics, Inc.,** Route 1, Box 8, Randolph, MN 55065, 507-645-7997

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Fujitsu 2284 174MBy, SMD. $3695
PRIAM 6650-20 60MBy, SMD $895
PRIAM 15450-20 150MBy, SMD .. $2195
Computer Parts Mart, 415-493-5930

FLOPPY DRIVE DEALS!
We test all our drives: TM100-4, 96 TPI $149, TM100-4M, 100 TPI for Micropolis, Vector $189, SA 460, DS, 80 tk $99, MICROPOLIS 115-V1, 96TPI $299, MPI 92S, DS, 96TPI $129, **Computer Parts Mart,** 3200 Park Blvd., Palo Alto, CA 94306. 415-493-5930

FOR SALE - Persci 8" dual floppy drive with Manuals. - $90.00, **415-276-2535** evenings.

HARD DISK, 5¼ inch, 5 megabyte, industry standard Seagate ST506. Fully checked, like new, with maintenance manual. Controllers are available for most popular computers. Limited quantities. $295. Call **Steve** at 513-433-1501 after 6pm. 1-62

HELP! NEED documentation (OEM and/or maintenance manuals) for Shugart 460 and 860 drives. Will buy, copy, trade. **916-753-4632.1-63**

INNOVEX 200 8" SSSD DRIVES, excellent quality. Can be used double density. 3 for $100. Complete, but require alignment or adjustment. **DIGITAL SEARCH** 803-877-9444

Innovex 200 8" SSSD Drives, excellent quality. Can be used double density. 3 for $100. Complete, but require alignment or adjustment. **DIGITAL SEARCH** 803-877-9444

MARKSMAN 15MB Hard Disk, Parallel Interface $400.00, Call Between 6 and 10 PM EST at **803-242-9096**

MEMOREX 550, 1 working, 1 parts. $50. **Glenn Nelson,** 406-862-3854.1-62

MORROW 20MBy S-100 Disk System: Discus M20 Hard Disk, HDCA-3 controller, 801 floppy, DJ-2D controller, power supply, case, documentation, software. $1250 - offer. Pick up only. 916-753-4632. 1-63

MORROW 20MBy S-100 Disk System: Discus M20 Hard Disk, HDCA-3 controller, 801 floppy, DJ-2D controller, power supply, case, documentation, software. $1250 - offer. Pick up only. 916-753-4632. 1-63

MPI 92S DSDD 80 Track Quad Density Used Tested Diskette Drives. $125, 2/$240 Postpaid. **William Wood,** 4863 S. Livonia Rd., Livonia, N.Y. 14487 3-64

MPI MOD 51S Same Drive as used in Radio Shack computers, in factory boxes with 6 month warranty $89.00 **C.E.C.,** (415)342-4058, P.O. Box 1965, Burlingame, Calif. 94010 3-63

Micro-floppy 3½" drives. 500k bytes Shugart SA300 w/warranty. $169 each. Same interface as 5¼" drives. **DIGITAL SEARCH** 803-877-9444

Micro-floppy 3½" drives. 500k bytes Shugart SA300 w/warranty. $169. each. Same interface as 5¼" drives. **DIGITAL SEARCH** 803-877-9444

SHUGART 851 used 10 hours $250.00, Shugart 801 in double 8" cabinet, P.S. $240.00, Pair Qume DSDD in double 8" cabinet, P.S. $600.00, Double 8" cabinet, P.S. $125.00, MP151 in cabinet, P.S. $125.00. **Call 404-636-8080.**

SHUGART DISK DRIVES FOR SALE. All units have been aligned, tested, and carry a 90 day part and labor warranty. SA-800 or SA-801 SSDD 8" $125, SA850 or SA-851 DSDD 8" $250, SA-810 ½ height SSDD 8" $125, SA-860 ½ height DSDD 8" $175, SA-410 5¼" 80 Track SSDD $50, SA-400L 5¼' 40 Track SSDD $90, SA-450 5¼" 40 Track DSDD $125. Also S-100 Boards, See Heading #129. Please call

$$$ SUPER SAVINGS $$$

- BASF Bulk Diskettes ..... SS/DD - 13.50/10
  with I.D. Labels, Sleeves, W.P. Tabs, Boxed ..... DS/DD - 15.50/10
- Verbatim Datalife Bulk Diskettes ..... SS/DD - 14.50/10
  with I.D. Labels, Sleeves, W.P. Tabs, Boxed ..... DS/DD - 16.50/10
- TYVEK - Sleeves for 5¼ Diskettes ..... .08 ea.
- DYSAN SS/DD - Factory Sealed #204/ID, 96/100 TPI 24.40/10
- Scotch Blackwatch Computer Tape - 3600 ft. with thick leader.
  In cannister, tested, flawless ..... 10.00 ea.
- 36 Pin Centronics Male - Solder Pot, Gold Contacts, With Hood ..... 4.50 ea.
- 36 Pin Centronics Male - I.D.C. for Ribbon Cable, Gold Contacts ..... 5.50 ea.
- DB-25 Y Cord M/F/F. Made for T.I. PC's - Retail 19.00 - our Price 4.50
- DB-25 P-Male, Gold Contacts, Solder Pot 2.20
- DB-25 S-Female, Gold Contacts. Solder Pot 3.00
- DB-25 Hood - 2 Piece, Gray, Fits above DB-25's 1.25
- 5 Pin DIN to 4 RCA Plug Cable - Color Coded, For Commodore 5.00
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- AC Line Cord - 4 ft. 18-3 Black ..... 1.50 ea.
- Corcom EMI Filter - 6A 115V Spade Term ..... 3.50 ea.
- .1 UF 50V Monolythic Cap (.3 Spacing, P.C. Leads) 100/7.50
- Dual 22 Edge Conn. - Gold Contacts (For VIC 20) ..... S.T. - 1.95 W.W. 2.50
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- 3 In. Fan - Sprite #SP2A2L - Removal, Tested, Very Clean 6.00

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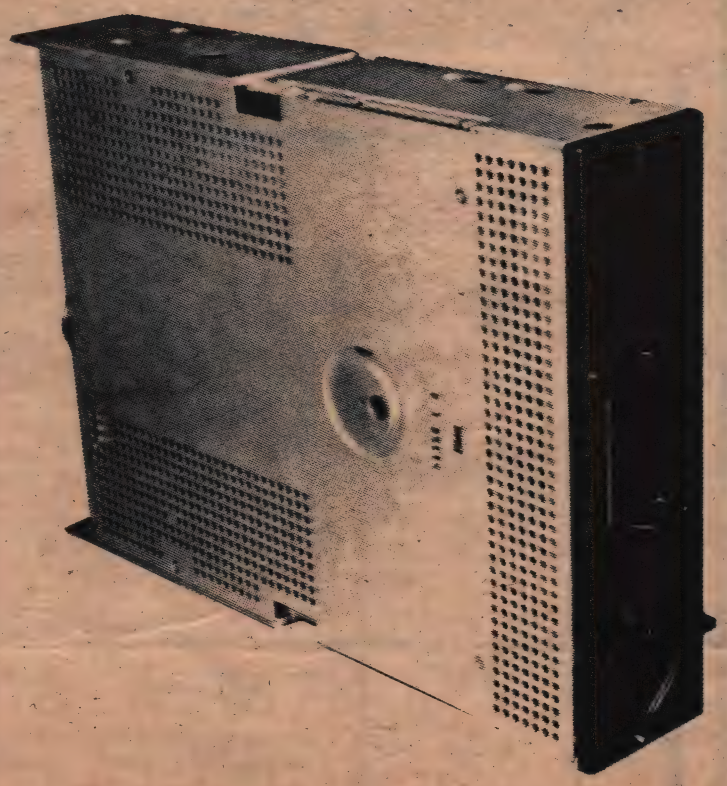

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(186) MODEMS

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TOSHIBA
P1351 Dot Matrix, 192 cps, letter quality 100 cps, does graphics. 3 in 1 printer	$1229
P1340 same as above but 10" carr.	719

PANASONIC
1091 w/Tractor, 120 cps, 1 yr. war.	$ 289

SOFTWARE

LOTUS DEVELOPMENT CORP.
Lotus 1-2-3	$ 295
Symphony	437

ASHTON TATE
D Base II	$ 329
D Base III	419

MICROPRO INTERNATIONAL
ProPak (WS/MM/SS/Star Index)	$ 399
Option Pak (M/M, C/S, S/I)	199

MICROSOFT
Softcard (CP/M)	$ 239
Microsoft Word	315
Premium Softcard for IIE	319
Softcard for II & II +	229

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COMPUTER CONNECTION

PRINTER ACCESSORIES

ORANGE MICRO
Grappler +	$ 115
Buffered Grappler +, 16K exp. 64K	165
Mr. Chips for PC & XT, Par. Ser. Clock & Cal., 64K Realworld I/F, BSR line I/F	389

TOSHIBA
Bi-Directional Tractor	$ 149
Font Disk for Down loading P1351	48

MICROTEK
Dumpling GX (same as Grappler +)	$ 75
Dumpling GX w/16K buffer	149
Dumpling GX w/32K buffer	165
Additional Buffering 16K	16

FOURTH DIMENSION
Par. Card & Cable for Apple	$ 45

OKIDATA
Plug and Play for IBM	$ 49
Okigraph I for 82A	49
Okigraph I for 83A	49
Tractor for 82A & 92	49

CABLES
IBM PC to Parallel Printer	$ 18
Serial Cable	18

DISPLAY MONITORS

NEC
JB 1201, 80 col., 20MHz	$ 129
JB 1205(A) 12" Amber, 20MHz	135
JC 1215 Color Composit w/audio	245
JC 1216 RGB, Hi-Res/IBM 640 x 300	365

AMDEK
V300G	$ 129
V300A	139
V310A for IBM PC	159
Color I +, Composite 13"	279
Color II +, Hi-Res. 13"/IBM	389
Color 300	249
Color 600	429
Color 710	585

TAXAN
IBM Green Monochrome #121	$ 139
IBM Amber Monochrome #122	145
RGB IBM w/Cable #420	419
RGB Super Hi-Res. #415	393
RGB/Comp. Med. Res. #210	259

PRINCETON GRAPHICS
HX-12 for use with IBM PC	$ 455
Max 12 Amber for IBM	179
SR 12 Super Hi-Res	595

MID-WINTER SPECIALS!!

C.ITOH 8510AP $309

LOTUS DEV. 1-2-3 $295

Symphony $437

BIZCOMP Intelli Modem ST 100% Comp. w/Smart Com. II & Crosstalk XVI $369

IBM MONO CARD W/Printer Port $245

QUME LETTERPRO 20 $449

MICRO-SCI A.5C Drive w/cable for IIc $189

AST RESEARCH Sixpak + w/64K $249

TEAC 55B $129

PGS HX12 $455

IBM PC ACCESSORIES

IBM
IBM Mono Card w/Printer Port	$ 245
IBM Mono Monitor	265
IBM Dos 2.1	59
IBM Dos 3.0	69
IBM Tech Ref. for PC	85

PARADISE
Modular GraphicsCard	$ 279
Module A	85
Module B	189

PC PEACOCK
Color Graphics Card w/Par. Printer Port, Compat. w/All IBM Software, 2 yr. war.	$ 215

AST RESEARCH
Six Pak + w/64K	$ 249
Mega Plus II	265

64K MEMORY UPGRADE
64K (9 chips) 150 ns, 1 yr. war.	$ 29

QUADRAM
Quad Color 1 Board	$ 199

VUTEK
Vutek - CPS Board, RGB & Composite w/Par. & Ser. Ports, 2 Yr. War.	$ 239

STB
Graphics + II	$ 359

TECHMAR
Graphics Master	$ 459

PERSYST BOARD
Bob Hi-Res Display Adp.	$ 459

KEYTRONICS
KB5151	$ 185

APPLE & FRANKLIN ACCESSORIES

ACCESSORIES
System Saver	$ 69
Fan for Apple II & IIE w/surge	37

APPLE
Super Serial Card	$ 139

MICROMAX
Viewmax 128K extended 80 col. card for Apple IIE	$ 129
80 col. card for Apple II & II +	139

PERSONAL SYSTEMS

APPLE
Apple IIE Starter System incl: Apple IIE, Tilt Monitor, 1 Drive w/contoller, 80 col. card.	Call
Apple IIc Lightweight Portable	999

IBM
IBM PC Bare w/cont. & keyboard	$1150
IBM PC 64K, 1 Drive	1325
IBM PC 64K, 2 Drives	1499
IBM PC, 2 Drives w/256K	1599
IBM XT, 128K, 10 Meg., 360K Dr.	3495
IBM AT Base	Call
IBM AT Enhanced	Call

Call About All "AT" Systems

KAYPRO
Kaypro II	$1279
Kaypro 4	1745
Kaypro 10	2395

SANYO
MBC 550-2 w/1 320K Drive & sftwr.	$ 895
MBC 555-2 w/2 320K Drives & more software	1075
Serial Port for Sanyo	79

TAVA
TAVA PC1 Par. & 1 Ser. Ports, 128K, 2-320K Drives, Color Card & Monitor	$1499
TAVA XT same as above including 10 meg. Hard Disk Drive	$2495

COMPAQ
256K, w/2 - 320K Drives	$2150

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TANDON
TM100-2 for IBM PC	$ 145
TM65-2, ½ Height, 320K	189

ALPHA OMEGA
10 Meg HD for IBM & Comp. w/Cont. Card 13 Month Warranty	$ 845

TEAC
55B Double Sided 360K	$ 129 2 for 249
Quad Density	189

EPSON
SD 521 Dbl/Dbl for IBM	$ 149

Drives For Apple & Franklin

RANA SYSTEMS
Elite I	$ 199
Elite II	339
Elite III	399
Controller add	85

MICRO-SCI
A-2	$ 179
A.5C for IIc w/cable	189
A.5 ½ height for IIE	209
Controller Add	70

MODEMS

ANCHOR
Mark XII	$ 225

HAYES MICRO
300 Baud Smart Modem	$ 205
1200 Baud Smart Modem	459
1200 B for IBM PC	379
Micro Modem IIE	259
Chronograph	189

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(213) 635-2809
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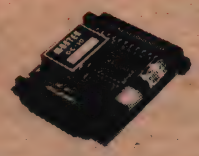
Commodore Accessories

RS232 ADAPTER FOR VIC-20 AND COMMODORE 64



The JE232CM allows connection of standard serial RS232 printers, modems, etc. to your VIC-20 and C-64. A 4-pole switch allows the inversion of the 4 control lines. Complete installation and operation instructions included.

• Plugs into User Port • Provides Standard RS232 signal levels • Uses 6 signals (Transmit, Receive, Clear to Send, Request to Send, Data Terminal Ready, Data Set Ready).

JE232CM $39.95

VOICE SYNTHESIZER FOR APPLE AND COMMODORE

• Over 250 word vocabulary - affixes allow the formation of more than 500 words • Built-in amplifier, speaker, volume control, and audio jack • Recreates a clear, natural male voice • Plug-in user ready with documentation and sample software • Case size: 7¼"L × 3¼"W × 1-3/8"H

APPLICATIONS: • Security Warning • Teaching • Instrumentation • Telecommunication • Handicap Aid • Games

Part No.	Description	Price
JE520CM	For Commodore 64 & VIC-20	$114.95
JE520AP	For Apple II, II+, and //e	$149.95

Computer Memory Expansion Kits

IBM PC, PC XT and Compatibles

Most of the popular Memory Boards (e.g. Quadram™ Expansion Boards) allow you to add an additional 64K, 128K, 192K or 256K. The IBM64K Kit will populate these boards in 64K byte increments. The Kit is simple to install—just insert the 9 - 64K RAM chips in the provided sockets and set the 2 groups of switches. Complete conversion documentation included.

IBM64K (Nine 200ns 64K RAMs). $33.49

IBM PC AT

Each kit comes complete with nine 128K dynamic RAMs and documentation for conversion.

IBM128K (Nine 250ns 128K RAMs). $199.95

APPLE *IIe*

Extended 80-Column/64K RAM Card. Expands memory by 64K to give 128K when used with programs like VisiCalc™. Fully assembled and tested.

JE864. . . . . $99.95

TRS-80 MODEL I, III

Each Kit comes complete with eight MM5290 (UPD416/4116) 16K Dynamic RAMs and documentation for conversion. Model 1: 16K equipped with Expansion Interface can be expanded to 48K with 2 Kits. Model III: Can be expanded from 16K to 48K using 2 Kits. Each Kit will expand computer by 16K increments.

TRS-16K3 200ns (Model III). $6.29
TRS-16K4 250ns (Model 1). $5.49

TRS-80 MODEL IV & 4P

Easy to install Kit comes complete with 8 ea. 4164N-20 (200ns) 64K Dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K-2. . . . . $29.95
(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). $49.95
(8 - 4164's with PAL Chip to expand from 64K to 128K)

TRS-80 COLOR AND COLOR II

Easy to install Kit comes complete with 8 each 4164N-20 (200ns) 64K Dynamic RAMs and documentation for conversion. Converts TRS-80 Color Computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 Color Computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K-2. . . . . $29.95

PTI INDUSTRIES

PROTECT YOURSELF...

DATASHIELD® Surge Protector

Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. 6-mo. warranty. Power dissipation (100 microseconds): 2,000,000 watts

PART NO.	DESCRIPTION	PRICE
MODEL 75	4 Sockets, On/Off Switch.	$49.95
MODEL 85	6 Sock., Super Filters, On/Off Switch.	$59.95
MODEL 100	6 Sock., Super Filters, Low Volt. Alarm.	$69.95
MODEL 110AMS	6 Sockets, Super Filters, Auto. Master Switch.	$99.95

DATASHIELD® Back-Up Power Source

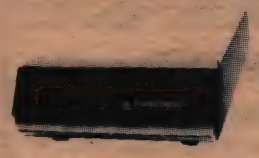
Protect your computer from black-outs, brown-outs, power surges and line noise. PTI's PC200 is designed for PCs with floppy disk memory, the XT300 for hard disk memory and the AT800 for multi-user systems. A typical compatible PC for each of these standbys will be supported for 15 to 25 minutes after power is lost. Weight (PC200: 24 lbs.) – (XT300: 37.5 lbs.) – (AT800: 72 lbs.)

PC200 (200 Watt Rating). $299.95
XT300 (300 Watt Rating). $399.95
AT800 (800 Watt Rating). $799.95

ProModem 1200 and Options

PROMETHEUS

Intelligent 300/1200 Baud Telephone Modem with Real Time Clock/Calendar



The ProModem™ is a Bell 212A (300/1200 baud) intelligent stand-alone modem • Full featured expandable modem • Standard features include Auto Answer and Auto Dial, Help Commands, Programmable Intelligent Dialing, Touch Tone™ and Pulse Dialing & More • Hayes command set compatible plus an additional extended command set • Shown w/alphanumeric display option.

Part No.	Description	Price
PM1200	RS-232 Stand Alone Unit.	$349.95
PM1200A	Apple II, II+ and //e Internal Unit.	$369.95
PM1200B	IBM PC and Compatible Internal Unit.	$269.95
PM1200BS	IBM PC & Comp. Int. Unit w/ProCom Software.	$319.95
MAC PAC	Macintosh Package. (Includes PM1200, Cable, & ProCom Software)	$399.95

OPTIONS FOR ProModem 1200

PM-COM	(ProCom Communication Software). Please specify Operating System.	$79.95
PM-OP	(Options Processor).	$79.95
PMO-16K	(Options Processor Memory – 16K).	$10.95
PMO-32K	(Options Processor Memory – 32K).	$20.95
PMO-64K	(Options Processor Memory – 64K).	$39.95
PM-ALP	(Alphanumeric Display).	$79.95
PM-Special	(Includes Options Processor, 64K Memory and Alphanumeric Display).	$189.95

KEYBOARDS

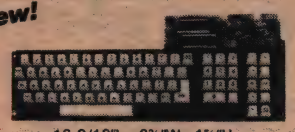
13⅛"L x 4¼"W x ¾"H

Mitsumi 54-Key Unencoded All-Purpose Keyboard

• SPST keyswitches • 20 pin ribbon cable connection • Low-profile keys • Features: cursor controls, control, caps (lock), function, enter and shift keys • Color (keycaps): grey • Wt.: 1 lb. • Pinout included

KB54. . . . . $14.95

New!



16-9/16"L x 6⅜"W x 1⅝"H

76-Key Serial ASCII Keyboard

• Simple serial interface • SPST switching • Operates in upper and lower case • Five user function keys: F1-F5 • Six finger edge card connection • Color (keys): tan • Weight: 2 lbs. • Data included

KB76. . . . . $29.95

Apple Keyboard and Case for Apple II and II+

• Keyboard: Direct connection with 16-pin ribbon connector • 26 special functions • Size: 14½"L x 5½"W x 1½"H

• Case: Accommodates KB-A68 • Pop-up lid for easy access • Size: 15½"W x 18"D x 4¼"H

Part No.	Description	Price
KB-EA1	Apple Keyboard and Case (pictured above).	$134.95
KB-A68	68-Key Apple Keyboard only.	$ 79.95
EAEC-1	Expanded Apple Enclosure Case only.	$ 59.95

POWER SUPPLIES

TRANSACTION TECHNOLOGY, INC. 5VDC @ 1 AMP Regulated Power Supply

• Output: +5VDC @ 1.0 amp (also +30VDC regulated) • Input: 115VAC, 60 Hz • Two-tone (black/beige) self-enclosed case • 6 foot, 3-conductor black power cord • Size: 6½" L x 7" W x 2¼" H • Weight: 3 lbs.

PS51194. . . . . $14.95

Power/Mate Corp. REGULATED POWER SUPPLY

• Input: 105-125/210-250 VAC at 47-63 Hz • Line regulation: ±0.05% • Three mounting surfaces • Overvoltage protection • UL recognized • CSA certified

Part No.	Output	Size	Weight	Price
EMA5/6B	5V@3A/6V@2.5A	4⅞"L x 4"W x 2⅛"H	2 lbs.	$29.95
EMA5/6C	5V@6A/6V@5A	5⅝"L x 4⅞"W x 2⅞"H	4 lbs.	$39.95

KEPCO/TDK 4-OUTPUT SWITCHING POWER SUPPLY

• Ideal for disk drive needs of CRT terminals, microcomputers and video games • Input: 115/230VAC, 50/60Hz • Output: +5V @ 5 Amp, +12V @ 1.8 Amp, +12V @ 2 Amp, -12V @ 0.5 Amp • UL recognized • CSA certified • Size: 7⅜"L x 6-3/16"W x 1⅝"H • Weight: 2 lbs.

$59.95 each or MRM 174KF. . . . . 2 for $99.95

Switching Power Supply for APPLE II, II+ & *IIe*™

• Can drive four floppy disk drives and up to eight expansion cards • Short circuit and overload protection • Fits inside Apple computer • Fully regulated +5V @ 5A, +12V @ 1.5A, -5V @ .5A. -12V @ .5A • Direct plug-in power cord included • Size: 9⅞"L x 3½"W x 2¼"H • Weight: 2 lbs.

KHP4007 (SPS-109). $59.95

4-CHANNEL SWITCHING POWER SUPPLY

• Microprocessor, mini-computer, terminal, medical equipment and process control applications • Input: 90-130VAC, 47-440Hz • Output: +5VDC @ 5A, -5VDC @ 1 A; +12VDC @ 1A, -12VDC @ 1A • Line regulations: ±0.2% • Ripple: 30mV p-p • Load regulation: ±1% • Overcurrent protection • Adj: 5V main output ±10% • Size: 6⅜"L x 1⅞"W x 4-15/16"H • Weight: 1½ lbs.

FCS-604A. $69.95

$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6½% Sales Tax
Shipping — Add 5% plus $1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

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5¼" APPLE™ Direct Plug-In Compatible Disk Drive and Controller Card

The ADD-514 Disk Drive uses Shugart SA390 mechanics—143K formatted storage • 35 tracks • Compatible with Apple Controller & ACC-1 Controller • The drive comes complete with connector and cable — just plug into your disk controller card • Size: 6"L x 3½"W x 8-9/16"D • Weight: 4½ lbs.

ADD-514 (Disk Drive). $169.95
ACC-1 (Controller Card). . . . . $ 49.95

More Apple Compatible Add-Ons...

APF-1	(Cooling Fan with surge protection).	$39.95
KHP4007	(Switching Power Supply).	$59.95
JE614	(Numeric/Aux. Keypad for *IIe*).	$59.95
KB-A68	(Keyboard w/Keypad for II & II+).	$79.95
MON-12G	(12" Green Monitor w/swivel stand).	$99.95
JE864	(80 Col. +64K RAM for *IIe*).	$99.95
ADD-12	(5¼" Half-Height Disk Drive).	$179.95

DISK DRIVES

Documentation Included — *Best Buys!*

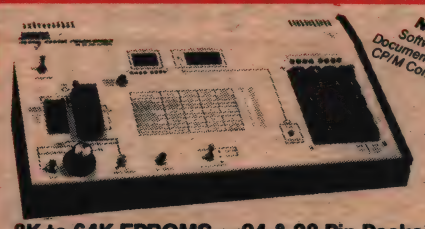
MPI51S	(MPI 5¼" SS full-ht.).	$ 89.95
RFD480	(Remex 5¼" DS full-ht.).	$129.95
TM100-2	(Tandon 5¼" DS full-ht.).	$159.95
FD55B	(Teac 5¼" DS half-ht.).	$149.95
SA455	(Shugart 5¼" DS half-ht.).	$159.95
FDD100-8	(Siemens 8" SS full-ht.).	$139.95
PCK-5	(5¼" Power Cable Kit).	$2.95
PCK-8	(8" Power Cable Kit).	$3.95

UV-EPROM Eraser

Erases all EPROMs. Erases up to 8 chips within 21 minutes (1 chip in 15 minutes). Maintains constant exposure distance of one inch. Special conductive foam liner eliminates static build-up. Built-in safety lock to prevent UV exposure. Compact — only 9.00"L x 3.70"W x 2.60"H. Complete with holding tray for 8 chips.

DE-4	UV-EPROM Eraser.	$74.95
UVS-11EL	Replacement Bulb.	$16.95

JE664 EPROM PROGRAMMER



8K to 64K EPROMS — 24 & 28 Pin Packages

Completely Self-Contained — Requires No Additional Systems for Operation

• Programs and validates EPROMs • Checks for properly erased EPROMs • Emulates PROMs or EPROMs • RS232C Computer Interface for editing and program loading • Loads data into RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • Compares EPROMs for content differences • Copies EPROMs • Power Input: 115VAC, 60Hz, less than 10W power consumption • Enclosure: Color-coordinated, light tan panels with molded end pieces in mocha brown • Size: 15⅝"L x 8¾"D x 3½"H • Weight: 5¾ lbs.

The JE664 EPROM Programmer emulates and programs various 8-Bit Word EPROMs from 8K to 64K-Bit memory capacity. Data can be entered into the JE664's internal 8K x 8-Bit RAM in three ways: (1) from a ROM or EPROM; (2) from an external computer via the optional JE665 RS232C BUS; (3) from its panel keyboard. The JE664's RAMs may be accessed for emulation purposes from the panel's test socket to an external microprocessor. In programming and emulation, the JE664 allows for examination, change and validation of program content. The JE664's RAMs can be programmed quickly to all "1"s (or any value), allowing unused addresses in the EPROM to be programmed later without necessity of "UV" erasing. The JE664 displays DATA and ADDRESS in convenient hexadecimal (alphanumeric) format. A "DISPLAY EPROM DATA" button changes the DATA readout from RAM word to EPROM word and is displayed in both hexadecimal and binary code. The front panel features a convenient operating guide. The JE664 Programmer includes one JM16A Jumper Module (as listed below).

JE664-A EPROM Programmer. $995.00

Assembled & Tested (Includes JM16A Module)

JE665 — RS232C INTERFACE OPTION — The RS232C Interface Option implements computer access to the JE664's RAM. This allows the computer to manipulate, store and transfer EPROM data to and from the JE664. A sample program listing is supplied in MBASIC for CP/M computers. Documentation is provided to adapt the software to other computers with an RS232 port. 9600 Baud, 8-bit word, odd parity with 2 stop bits.

EPROM Programmer w/JE665 Option
JE664-ARS. $1195.00

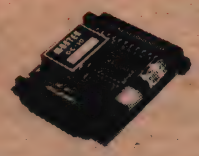
Assembled & Tested (Includes JM16A Module)

EPROM JUMPER MODULES — The JE664's JUMPER MODULE (Personality Module) is a plug-in Module that pre-sets the JE664 for the proper programming pulses to the EPROM and configures the EPROM socket connections for that particular EPROM.

JE664 EPROM Jumper Mod. No.	EPROM	Programming Voltage	EPROM MANUFACTURER	PRICE
JM08A	2708	25V	AMD, Motorola, Nat., Intel, TI.	$14.95
JM16A	2716, TMS2516 (TI)	25V	Intel, Motorola, Nat., NEC, TI, AMD, Hitachi, Mostek.	$14.95
JM16B	TMS2716 (3-V's)	-5V,+5V,+12V	Motorola, TI.	$14.95
JM32A	TMS2532	25V	Motorola, TI, Hitachi, OKI.	$14.95
JM32B	2732	25V	AMD, Fujitsu, NEC, Hitachi, Intel, Mitsubishi, National.	$14.95
JM32C	2732A	21V	Fujitsu, Intel.	$14.95
JM64A	MCM68764, MCM68L764	21V	Motorola.	$14.95
JM64B	2764	21V	Intel, Fairchild, OKI.	$14.95
JM64C	TMS2564	25V	TI.	$14.95

Commodore Accessories

RS232 ADAPTER FOR VIC-20 AND COMMODORE 64



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JE520AP	For Apple II, II+, and //e	$149.95

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IBM PC, PC XT and Compatibles

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IBM64K (Nine 200ns 64K RAMs). $33.49

IBM PC AT

Each kit comes complete with nine 128K dynamic RAMs and documentation for conversion.

IBM128K (Nine 250ns 128K RAMs). $199.95

APPLE *IIe*

Extended 80-Column/64K RAM Card. Expands memory by 64K to give 128K when used with programs like VisiCalc™. Fully assembled and tested.

JE864. . . . . $99.95

TRS-80 MODEL I, III

Each Kit comes complete with eight MM5290 (UPD416/4116) 16K Dynamic RAMs and documentation for conversion. Model 1: 16K equipped with Expansion Interface can be expanded to 48K with 2 Kits. Model III: Can be expanded from 16K to 48K using 2 Kits. Each Kit will expand computer by 16K increments.

TRS-16K3 200ns (Model III). $6.29
TRS-16K4 250ns (Model 1). $5.49

TRS-80 MODEL IV & 4P

Easy to install Kit comes complete with 8 ea. 4164N-20 (200ns) 64K Dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K-2. . . . . $29.95
(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). $49.95
(8 - 4164's with PAL Chip to expand from 64K to 128K)

TRS-80 COLOR AND COLOR II

Easy to install Kit comes complete with 8 each 4164N-20 (200ns) 64K Dynamic RAMs and documentation for conversion. Converts TRS-80 Color Computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 Color Computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

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Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. 6-mo. warranty. Power dissipation (100 microseconds): 2,000,000 watts

PART NO.	DESCRIPTION	PRICE
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MODEL 85	6 Sock., Super Filters, On/Off Switch.	$59.95
MODEL 100	6 Sock., Super Filters, Low Volt. Alarm.	$69.95
MODEL 110AMS	6 Sockets, Super Filters, Auto. Master Switch.	$99.95

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Protect your computer from black-outs, brown-outs, power surges and line noise. PTI's PC200 is designed for PCs with floppy disk memory, the XT300 for hard disk memory and the AT800 for multi-user systems. A typical compatible PC for each of these standbys will be supported for 15 to 25 minutes after power is lost. Weight (PC200: 24 lbs.) – (XT300: 37.5 lbs.) – (AT800: 72 lbs.)

PC200 (200 Watt Rating). $299.95
XT300 (300 Watt Rating). $399.95
AT800 (800 Watt Rating). $799.95

ProModem 1200 and Options

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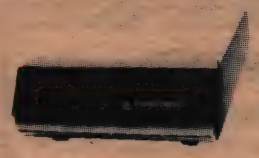
Intelligent 300/1200 Baud Telephone Modem with Real Time Clock/Calendar



The ProModem™ is a Bell 212A (300/1200 baud) intelligent stand-alone modem • Full featured expandable modem • Standard features include Auto Answer and Auto Dial, Help Commands, Programmable Intelligent Dialing, Touch Tone™ and Pulse Dialing & More • Hayes command set compatible plus an additional extended command set • Shown w/alphanumeric display option.

Part No.	Description	Price
PM1200	RS-232 Stand Alone Unit.	$349.95
PM1200A	Apple II, II+ and //e Internal Unit.	$369.95
PM1200B	IBM PC and Compatible Internal Unit.	$269.95
PM1200BS	IBM PC & Comp. Int. Unit w/ProCom Software.	$319.95
MAC PAC	Macintosh Package. (Includes PM1200, Cable, & ProCom Software)	$399.95

OPTIONS FOR ProModem 1200

PM-COM	(ProCom Communication Software). Please specify Operating System.	$79.95
PM-OP	(Options Processor).	$79.95
PMO-16K	(Options Processor Memory – 16K).	$10.95
PMO-32K	(Options Processor Memory – 32K).	$20.95
PMO-64K	(Options Processor Memory – 64K).	$39.95
PM-ALP	(Alphanumeric Display).	$79.95
PM-Special	(Includes Options Processor, 64K Memory and Alphanumeric Display).	$189.95

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13⅛"L x 4¼"W x ¾"H

Mitsumi 54-Key Unencoded All-Purpose Keyboard

• SPST keyswitches • 20 pin ribbon cable connection • Low-profile keys • Features: cursor controls, control, caps (lock), function, enter and shift keys • Color (keycaps): grey • Wt.: 1 lb. • Pinout included

KB54. . . . . $14.95

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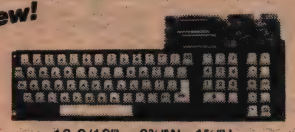

16-9/16"L x 6⅜"W x 1⅝"H

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• Simple serial interface • SPST switching • Operates in upper and lower case • Five user function keys: F1-F5 • Six finger edge card connection • Color (keys): tan • Weight: 2 lbs. • Data included

KB76. . . . . $29.95

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• Keyboard: Direct connection with 16-pin ribbon connector • 26 special functions • Size: 14½"L x 5½"W x 1½"H

• Case: Accommodates KB-A68 • Pop-up lid for easy access • Size: 15½"W x 18"D x 4¼"H

Part No.	Description	Price
KB-EA1	Apple Keyboard and Case (pictured above).	$134.95
KB-A68	68-Key Apple Keyboard only.	$ 79.95
EAEC-1	Expanded Apple Enclosure Case only.	$ 59.95

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• Can drive four floppy disk drives and up to eight expansion cards • Short circuit and overload protection • Fits inside Apple computer • Fully regulated +5V @ 5A, +12V @ 1.5A, -5V @ .5A. -12V @ .5A • Direct plug-in power cord included • Size: 9⅞"L x 3½"W x 2¼"H • Weight: 2 lbs.

KHP4007 (SPS-109). $59.95

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ADD-514 (Disk Drive). $169.95
ACC-1 (Controller Card). . . . . $ 49.95

More Apple Compatible Add-Ons...

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KB-A68	(Keyboard w/Keypad for II & II+).	$79.95
MON-12G	(12" Green Monitor w/swivel stand).	$99.95
JE864	(80 Col. +64K RAM for *IIe*).	$99.95
ADD-12	(5¼" Half-Height Disk Drive).	$179.95

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DE-4	UV-EPROM Eraser.	$74.95
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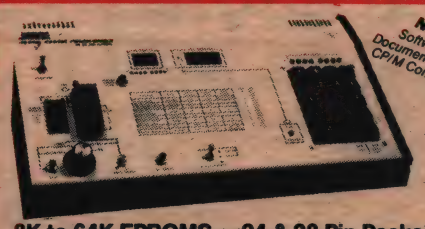
JE664 EPROM PROGRAMMER



8K to 64K EPROMS — 24 & 28 Pin Packages

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• Programs and validates EPROMs • Checks for properly erased EPROMs • Emulates PROMs or EPROMs • RS232C Computer Interface for editing and program loading • Loads data into RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • Compares EPROMs for content differences • Copies EPROMs • Power Input: 115VAC, 60Hz, less than 10W power consumption • Enclosure: Color-coordinated, light tan panels with molded end pieces in mocha brown • Size: 15⅝"L x 8¾"D x 3½"H • Weight: 5¾ lbs.

The JE664 EPROM Programmer emulates and programs various 8-Bit Word EPROMs from 8K to 64K-Bit memory capacity. Data can be entered into the JE664's internal 8K x 8-Bit RAM in three ways: (1) from a ROM or EPROM; (2) from an external computer via the optional JE665 RS232C BUS; (3) from its panel keyboard. The JE664's RAMs may be accessed for emulation purposes from the panel's test socket to an external microprocessor. In programming and emulation, the JE664 allows for examination, change and validation of program content. The JE664's RAMs can be programmed quickly to all "1"s (or any value), allowing unused addresses in the EPROM to be programmed later without necessity of "UV" erasing. The JE664 displays DATA and ADDRESS in convenient hexadecimal (alphanumeric) format. A "DISPLAY EPROM DATA" button changes the DATA readout from RAM word to EPROM word and is displayed in both hexadecimal and binary code. The front panel features a convenient operating guide. The JE664 Programmer includes one JM16A Jumper Module (as listed below).

JE664-A EPROM Programmer. $995.00

Assembled & Tested (Includes JM16A Module)

JE665 — RS232C INTERFACE OPTION — The RS232C Interface Option implements computer access to the JE664's RAM. This allows the computer to manipulate, store and transfer EPROM data to and from the JE664. A sample program listing is supplied in MBASIC for CP/M computers. Documentation is provided to adapt the software to other computers with an RS232 port. 9600 Baud, 8-bit word, odd parity with 2 stop bits.

EPROM Programmer w/JE665 Option
JE664-ARS. $1195.00

Assembled & Tested (Includes JM16A Module)

EPROM JUMPER MODULES — The JE664's JUMPER MODULE (Personality Module) is a plug-in Module that pre-sets the JE664 for the proper programming pulses to the EPROM and configures the EPROM socket connections for that particular EPROM.

JE664 EPROM Jumper Mod. No.	EPROM	Programming Voltage	EPROM MANUFACTURER	PRICE
JM08A	2708	25V	AMD, Motorola, Nat., Intel, TI.	$14.95
JM16A	2716, TMS2516 (TI)	25V	Intel, Motorola, Nat., NEC, TI, AMD, Hitachi, Mostek.	$14.95
JM16B	TMS2716 (3-V's)	-5V,+5V,+12V	Motorola, TI.	$14.95
JM32A	TMS2532	25V	Motorola, TI, Hitachi, OKI.	$14.95
JM32B	2732	25V	AMD, Fujitsu, NEC, Hitachi, Intel, Mitsubishi, National.	$14.95
JM32C	2732A	21V	Fujitsu, Intel.	$14.95
JM64A	MCM68764, MCM68L764	21V	Motorola.	$14.95
JM64B	2764	21V	Intel, Fairchild, OKI.	$14.95
JM64C	TMS2564	25V	TI.	$14.95

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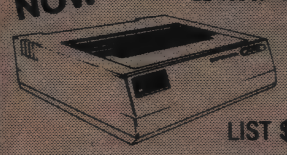

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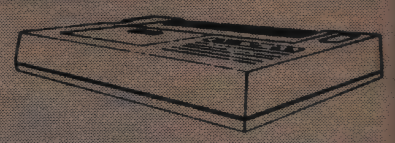
ALL NEW *The color printer that's all business. . .*

OKIMATE 20



ONLY $139

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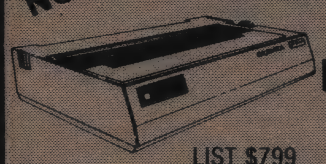

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Also offering correspondence quality printing, versatile data processing capabilities, speed with the additional feature of wide column printing, its the OKI 93.

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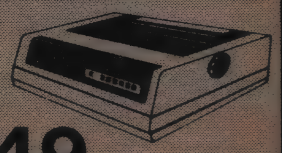

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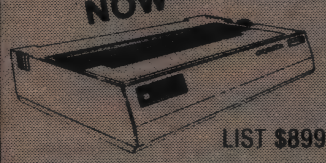

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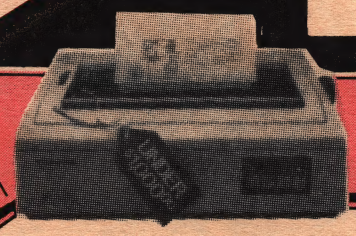

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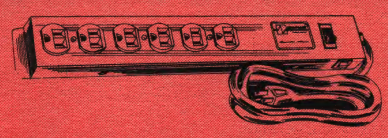

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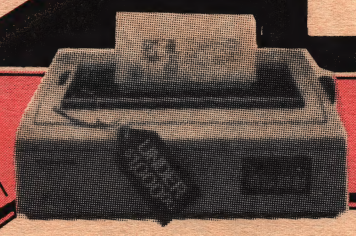

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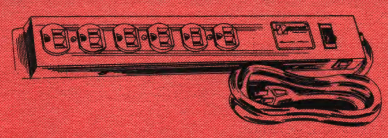

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